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OBSERVATIONS ON SOME PIG DISEASES *

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SO-CALLED " GUT OEDEMA "

So-called " gut oedema " in the pig has been recognised in Northern Ireland for many years. In 1938 Shanks and Lamont both described the condition under " An unusual condition affecting the digestive organs of the pig." The terms " gut oedema " or " dropsy of the bowel " have gained widespread currency, not because these terms are descriptive of the clinical entity under discussion, but because they do refer to a well-defined *post-mortem* finding seen in the majority of pigs which die from this condition. A more apt name for the disease must await further investigation into its nature and cause. The disease is now widespread in Ireland and in recent years it has become one of the most important hazards to store pigs in Ulster.

Typically it affects pigs ten to 16 weeks of age. In many cases the first thing noticed is that the pig refuses food, then a degree of oedema of the eyelid develops, this oedema being regarded as an important diagnostic symptom. In some cases, however, appetite is maintained and the first abnormality seen is a degree of inco-ordination.

The inco-ordination, slight at first, gradually progresses. The affected pig may be noticed stumbling when it turns quickly, or a stringhalt-like action of the hind limbs may be observed. The inco-ordination first may involve either the front or the hind limbs and eventually a flaccid paralysis supervenes. Usually death occurs within 36 hours after the onset of symptoms; a few pigs may survive longer —we have seen odd cases survive five to seven days before death—but most affected pigs die in 12 to 18 hours. Mortality among pigs actually showing symptoms is high but a small percentage of recoveries does occur. In such cases symptoms have seldom passed beyond a mild degree of inco-ordination, for once paralysis is complete death is the usual termination. Recently, however, we have seen recoveries in pigs near bacon weight which had been completely paralysed: here recovery is slow and convalescence prolonged. In some cases death is sudden without any premonitory symptoms. In this disease the grunt commonly is altered and is usually very hoarse, an alteration usually associated with oedema of the larynx. The incidence varies considerably from outbreak to outbreak: sometimes only one pig in a litter is affected while in other cases the whole litter is wiped out.

Many of our cases have been seen in bought-in pigs within three to 14 days of their arrival on the new premises. Pigs subjected to change of some kind seem particularly susceptible; *e.g.*, recently weaned pigs, pigs changed from one house to another, or pigs subjected to a sudden change of feeding. However, the condition is by no means confined to such pigs, and cases occur where there have been no recent changes in either environment or management. We have seen the condition in pigs varying in age from a second litter sow to nine weeks' old pigs still on the sow. There is apparently no consistent rise in temperature and by the time paralysis sets in temperatures are usually subnormal. Carcases of affected pigs, butchered and dressed, will pass the ordinary meat inspection examination. We have several records of the condition appearing in successive litters from the same sow.

The disease shows little or no tendency to spread from the litter in which it first appears and we can recall only very few instances in which spread of the disease appeared to take place on the farm. In one such case a litter of seven pigs bought in a local market all died within a week of their arrival on the farm. In an adjacent pen separated by a 4 foot wall, symptoms appeared in three out of ten home-reared pigs four days after the arrival of the bought-in lot. These three pigs died after showing symptoms similar to those bought in. The diagnosis of this secondary outbreak was based on the observations of the owner's veterinary surgeon and was purely clinical ; *post-mortem* examinations were not carried out. Again we have seen the disease breaking out among larger lots of pigs—up to 30 in number ; here the condition appeared not to strike indiscriminately and losses seemed to be confined to one litter. This observation is based on information supplied by the attendant who maintained that he could detect litter mates even when mixed among pigs of the same age. We have seen the condition all the year round and under varying conditions of feeding and management.

Post-mortem FINDINGS

Carcases are usually in good condition. The eyelids commonly show a varying amount of oedema, which may extend over the nasal bones towards the snout. A subcutaneous oedema extending along the belly has been noted in many cases, as well as oedema of the elbow and hock joints, and the region of the throat and ears.

The most consistent *post-mortem* finding is a degree of oedema in the stomach wall between the muscular coat and the mucous membrane. It occurs mainly along the greater curvature and extends a varying distance on both parietal and visceral surfaces, and may vary in thickness from being just detectable to 1½ inches in depth. It is sometimes localised near the oesophageal end of the stomach.

In the pig recently dead and where the oedema is marked, a quantity of serous coloured fluid oozes from the cut surface of the stomach. This fluid gels on exposure to the air. The stomach itself is usually full of food even though the pig may not have eaten anything for 24 hours

* This article formed the basis of a paper given by one of us [D. L.] to the North of Ireland Veterinary Medical Association on October 7th, 1949.

Fig. I.—Stomach of pig showing marked oedema.

before death. The consistency of the stomach contents is much drier and more crumbly than normal.

The folds of the mesentery supporting the spiral coil of the colon are also a common site of oedema, which is confined to them ; it does not involve the wall of the large intestine and in such cases the coils of the large intestine appear to be fixed in a clear jelly-like clot. The adjacent mesenteric lymph glands are usually oedematous and frequently congested. It is interesting to note that we have seen oedema involving the mesentery of the spiral coil of the colon in a pig one week old. In this case a definite diagnosis was not made ; death was sudden but no other characteristic feature of " gut oedema " was observed. In another case a similar type of oedema was associated with a *Salmonella* infection in pigs approximately three weeks old.

Occasionally the oedema may be confined to a portion of the small intestine, and one case of oedema of the spinal cord has been recorded here (Lamont). In pigs which survive for some time it may be impossible to demonstrate oedema at *post-mortem* examination.

Some degree of gastroenteritis has been noted in a number of cases but it is difficult to assess this common *post-mortem* finding in relation to the present condition.

The muscular coat of the small intestine distal to the duodenum often appears to have contracted, with the result that the underlying mucous membrane is thrown into folds. The edges of the ridges thus formed in the mucous membrane generally are inflamed. This portion of the gut is usually devoid of ingesta.

Excess pleural, peritoneal and pericardial fluid is seen and up to half a litre of peritoneal fluid has been recorded on one occasion. This fluid, too, gels on exposure to the atmosphere. Occasionally the *post-mortem* examination of a pig which has died showing typical symptoms is completely negative.

The skeletal musculature is usually very pale and the whole carcase has the appearance of having been partially bled. This finding is often of assistance in arriving at a diagnosis in some doubtful cases.

Cultures, anaerobic and aerobic, on the ordinary laboratory media have consistently been devoid of anything of pathological significance, nor have we been able to demonstrate toxins in the alimentary canal.

In spite of our lack of knowledge as to the cause of the condition we have tried various lines of treatment in the field. It is difficult to assess the value of any line of treatment in the absence of adequate controls and the cessation of deaths after a particular drug has been used is no criterion of its value in view of the wide variation in the death-rate in different litters and the fact that some pigs will recover without treatment.

Lamont and Shanks originally recommended cutting down the amount of food fed, the administration of full doses of Epsom salts and putting the pigs on bran slop for a few days, then gradually bringing them on to a full diet once again. In many cases this does appear to be sufficient to stop the losses, but on the other hand, we have had outbreaks where deaths continued in spite of adequate purgation and starvation.

We have tried repeated doses of various hyperimmune *welchii* sera, all without any apparent therapeutic effect. Large and repeated doses of adrenalin have produced no result. It looked, at one time, as though we were getting some recoveries after using one of the synthetic anti-histamine preparations, but the value of these drugs has not been confirmed.

Penicillin and various sulphonamides have all been tried on occasion with apparent benefit, but these successes were not repeated on further trial.

In view of the full state of the stomach found at *post-mortem* examination it was thought that emptying the stomach might help. Subcutaneous injections of parasympathetic stimulants, besides inducing purgation also caused vomiting, but here again while we appeared to have some initial successes with this treatment we have had many more failures. Injections of calcium borogluconate and magnesium sulphate have been tried without success.

We have attempted to reproduce the disease by various experimental procedures, but so far without any conclusive results. We have tried the following methods:—

1. Feeding oedematous organs to healthy pigs. In all, 15 pigs were involved in three experiments: oedematous material was cut up and mixed with the food.

2. Subcutaneous inoculation of an extract of oedematous material. About 100 grammes of oedematous stomach wall was ground up with 50 c.c. normal saline and sterile sand. This was filtered through muslin and the filtrate inoculated subcutaneously in 5 c.c. doses to eight pigs.

3. Brain and spinal cord from typical cases were ground up in sufficient saline to produce an injectable emulsion. This was inoculated intracranially into ten pigs in doses of 0·15 c.c.

4. Intranasal inoculation of material similar to No. 3. 5 c.c. of material was inoculated into each nostril of 13 pigs.

5. Subcutaneous inoculation of material similar to No. 3. Here 2 c.c. doses were used in eight pigs.

6. Intraocular inoculation of material similar to No. 3. Here only one pig was used.

7. Epidural inoculation of material similar to No. 3. 0·5 c.c. doses were administered to three pigs.

8. By " steaming up " experimental pigs through changing them suddenly to a nutritious diet ; ten pigs were involved. (See later).

9. By feeding a diet containing activated cyanogenetic glucoside; here again, ten pigs were involved. (See later).

10. By field contact ; here healthy pigs were placed in a pen where deaths were occurring from " gut oedema."

All our attempted transmission experiments have admittedly been on a limited scale, and restricted to the number of pigs available at a particular time, usually one litter of eight to nine pigs. The epidemiology of the condition in the field has many features usually associated with an infectious disease. Practitioners report what amounts to minor epidemics of the disease in their areas, though on the farm, as has been pointed out, the condition is very often confined to one lot of pigs even though there are others of apparent susceptible ages on the premises.

It does not seem likely that pathogenic bacteria are involved in view of the repeated negative bacteriological findings and the difficulties met with in setting up the disease experimentally, nor have we been able to find any evidence of toxin production in the gut contents by animal inoculation or by anaerobic culture.

In the field we have often noticed that outbreaks seemed to appear commonly in pigs thriving better than average (though here again there is an apparent change in the character of the disease as the condition now is by no means always confined to the best pigs). We tried the effect of putting pigs on to a very nutritious diet and at the same time we studied possible effects of feeding linseed meal in which the cyanogenetic glucoside had been activated by heat. For these purposes we used calf meal. This is a compound meal prepared to the Ministry of Agriculture formula of which the following is a typical example.

Animal Protein ...	5%
Dried Meal	5%
Linseed Cake Meal	30%
Wheat Feed	25%
Barley Meal	10%
Maize Meal	20%
Locust Bean	5%
Cod Liver Oil ...	½%
Ground Limestone	¾%
Salt	¼%

The calf meal was steamed in a water bath for five to six hours before feeding at 45° C. Within two to three hours of first feeding the treated meal one of the experimental pigs began to show typical symptoms and died the next day. " Gut oedema " was confirmed at *post-mortem* examination. The remaining five pigs kept healthy during the 14 days when the treated meal was fed and they were eventually disposed of for bacon. This experiment was repeated without any of the pigs showing evidence of disease.

Dietary deficiencies have been considered. In Northern Ireland pigs are usually fed a mixture of pig meal and potatoes. This pig meal is also compounded according to an official formula, but its constituents vary from time to time according to the availablity of the different feeding-stuffs. The following is a typical formula:—

High vegetable protein ...	7½%
Animal protein	1¼%
Wheat Feed	20%
Barley Meal	20%
Maize Meal	36¼%
Low Protein	10%
Potato Flour	5%

The potatoes are boiled and the meal is mixed with the boiled potatoes. The mixture forms the basic diet of the vast majority of pigs in Northern Ireland. However, we have not been able to correlate outbreaks of " gut oedema " with any particular issue of meal. We have also fed experimental pigs on mixtures of meal and potatoes actually being fed to litters where deaths were occurring. These experimental pigs remained healthy. Again, as has been pointed out, the disease is often confined to one lot of pigs on the premises even though the rest of the pigs are receiving exactly the same diet.

The " gut oedema " syndrome shows certain features which might be associated with anaphylaxis. We have tried to sensitise pigs using extracts of the high protein fraction of the pig meal, but we have not been able to reproduce any of the symptoms of " gut oedema." Experimental anaphylaxis in the pig does not always appear to be a straightforward matter of sensitisation and subsequent shocking, and there are features of this phenomenon in the pig which require further elucidation.

The possibility of a virus being the cause of the condition must be considered, but if it is present the virus must be very fragile in view of the negative transmission experiments or, on the other hand, pigs may vary considerably in susceptibility. This latter point would explain some of the characters of the disease in the field and such variation in susceptibility might in turn be due to fairly widespread sub-clinical infections. This latter point might explain the lack of success attending attempted experimental transmissions for, of necessity, the immunological status of the experimental pigs is unknown. The character of the disease has changed somewhat in recent years and the percentage of sick pigs which recover is higher now than formerly. This might be due to alterations in virulence of the infective agent, if such exists, or to an increase in the resistance of the pig population.

The occurrence of the disease in successive litters of a particular sow might indicate a carrier status on the part of the dam, but this seems unlikely in view of the fact that pigs usually contract the disease at a varying period after weaning. The possibility of the persistence of possible infection on the premises in these cases is a matter of speculation.

One of our attempted transmission experiments is worthy of comment. In this experiment we were using brain and spinal cord material for intranasal and intracranial inoculation in two litters while a third litter was maintained as a control. About 12 days after the experiment began one of the control pigs died with typical " gut oedema," but the inoculated pigs remained healthy and were finally disposed of for bacon and no further signs of illness were seen in the rest of the control group.

Histological section of brain and spinal cord does not reveal any changes usually associated with virus infections.

It is inevitable that comparisons should be made between the disease and porcine encephalo-myelitis (Teschen disease). This latter disease has become widespread on the Continent of Europe since it was first described in Czechoslovakia in 1929. It is fairly well established that Teschen disease is due to a virus which is to be found in the central nervous system of the affected pig. However, in contrast to " gut oedema " Teschen disease can be uniformly transmitted in pigs three to ten kilogrammes in weight, and this transmission can be achieved *via* the intracerebral, subdural or intranasal routes: it is estimated that by these routes over 80 per cent. of pigs will react and show evidence of disease though not all will show paralysis. Teschen disease has been seen in piglets five days old, and in pigs up to 200 kilogrammes in weight. The incubation period is three to 31 days. There is an initial rise in temperature with dullness, loss of appetite and slight ataxia of the hind

limbs. Some nervous irritability is often seen with convulsions passing to paralysis which most frequently involves the hind limbs.

It will be seen that Teschen disease has certain affinities, particularly clinically, with gut oedema, but it differs particularly in the comparative ease with which experimental Teschen disease can be set up. Teschen disease usually attacks pigs at an earlier age than does gut oedema and in the former the well-marked oedema of the internal organs has not been described. Histologically, too, Teschen disease produces well-defined changes in the brain. Whether any true relationship exists between these two diseases must await further investigation.

AN ECZEMATOUS CONDITION OF SUCKING PIGS

Attention is drawn to an eczematous condition affecting young suckling pigs which occurs fairly commonly in Northern Ireland. Piglets are usually attacked within the first three weeks after farrowing and the onset is sudden.

In the affected pig the skin becomes reddened in patches. There is some oozing of serous fluid and the superficial layer of the skin is easily rubbed off, leaving a moist, weeping, pinkish red area underneath. This moist area soon becomes overlaid with dirt. The head, face, ears and belly are the areas most commonly affected, though small patches may occur all over the body. Pigs usually have been thriving normally up to the time of onset, but the condition leads to a rapid loss of weight with dullness and inappetence. Piglets which have died from the disease are usually very hairy and in poor condition. A degree of pruritus is seen but itchiness is not necessarily a prominent symptom. Usually all the litter is affected, the death rate varies and we have seen whole litters wiped out within a week.

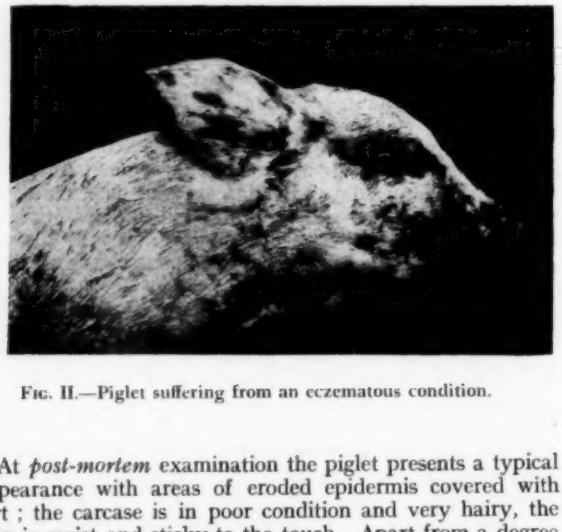


Fig. II.—Piglet suffering from an eczematous condition.

At *post-mortem* examination the piglet presents a typical appearance with areas of eroded epidermis covered with dirt ; the carcase is in poor condition and very hairy, the skin is moist and sticky to the touch. Apart from a degree of anaemia which usually is present, no other abnormality is seen in the internal organs ; bacteriological examination is negative.

Control

Recently we have had very good results with a paint, applied to the sow's udder, made up with the usual anaemia control mixture, *i.e.*, ferrous sulphate, copper sulphate and treacle, to which is added "Marmite." "Marmite" is a vitamin B supplement and the declared vitamin content is riboflavin 1·5 mg. per oz. and niacin 16·5 mg. per oz. A rapid improvement is seen following this treatment. The "Marmite" is added in the proportion of one in eight parts of the anaemia mixture.

ASCARID INFESTATION IN PIGS

There is a tendency in some quarters to belittle the damage done by the adult ascarid worm in the alimentary canal of the pig. The "blows" or "thumps" produced by the mass migration of young larvae in the lung is, of course, more spectacular. Our observations, however, support the view that the adult ascarid in the gut of the pig can definitely retard thriving, and that a rapid improvement can be seen after the use of an effective anthelmintic. It is the considered view of some American workers that the weight gains in growing pigs are inversely proportional to the number of worms present.

As anthelmintic we have used sodium fluoride with excellent results, but there are a few considerations to be kept in mind when using this drug. The first is that the recommended dosages have been worked out for the ordinary commercial grade of the drug which contains 73 per cent. pure sodium fluoride. The drug is well tolerated by most pigs but it is very poisonous to other classes of stock, particularly poultry, so that care is necessary when handling and storing the drug on the farm.

The original recommendation was to give the drug at the rate of 1 per cent. of the feed, calculated as dry meal, and we can confirm that at this dosage the drug is effective and safe. This method of computing the dose is convenient when meal forms the main part of the diet, but where swill is used or where potatoes are added the computing of the dose by weight of the pig is more convenient. The scale worked out by the Australian workers of 0·1 to 0·15 grammes per lb. body weight we have found satisfactory. In our experience the drug is well tolerated at these scales of dosage. A few pigs may vomit after ingesting the drug. This in itself ensures that overdosing of individual pigs does not take place—an important point in the mass treatment of animals. We do not think that preliminary preparation of the pigs is necessary: where pigs are starved beforehand we find that a higher percentage will vomit. Some people claim better results by giving magnesium sulphate on the day following the sodium fluoride, but we regard this as unnecessary. The worms do not appear in the excreta until about 48 to 72 hours after treatment. A few pigs may scour slightly for a few days after treatment but this usually clears up without any untoward sequelae. Under ordinary conditions multiple treatments are not necessary but the routine treatment of all pigs when they go into the fattening pen has much to recommend it.

Although the medicated feed is not very palatable no other food should be given until the treated meal has been cleared up. If pigs are very slow in finishing it, a little skim milk thrown over the remains of the medicated meal usually results in its complete consumption.

PIGLET ANAEMIA

Piglet anaemia, in our opinion, is one of the most important conditions of the young pig, and this opportunity is taken to emphasise some of the main features of this very common malady. Not only is anaemia important as a source of direct loss but it is the indirect cause of much

poor thriving later in life ; unquestionably it is one of the primary predisposing causes of many of the important pathological conditions seen in the growing pig.

The conditions in which anaemia develops are no doubt familiar to you all, as are the accepted methods of control, and here attention is drawn only to certain features of the condition that perhaps are not widely enough appreciated. The sow's milk is not an adequate source of iron and the iron reserves of the new born pig cannot be influenced to any material extent by iron supplements in the antenatal diet of the sow. It has been estimated that the young pig may expect to get about 23 mg. of iron from the sow's milk during its first three weeks of life, whereas its total requirements during the same period are of the order of about 300 mg., or about 13 times as much as the pig can expect from its mother's milk. The onset of a degree of anaemia is therefore inevitable in all young pigs reared indoors, but the severity, from litter to litter and among pigs of the same litter, may vary a lot. There is what is called a " physiological drop " in the haemoglobin content of the blood after birth. The haemoglobin values for the new born pig are about 9 to 11 grammes per cent. and this value after birth may fall to 4 to 5 grammes per cent. The drop is at its maximum about the eighth to tenth days and thereafter there should be a return to normal. This return can be hastened by giving iron supplements or allowing the young pigs access to soil. The longer this return to normal haemoglobin levels is delayed the more severe will be the clinical signs of anaemia and the greater the setback suffered by the litter. The passing of yellowish or whitish dung by the young pig is an indication of iron depletion and of the anaemic state.

Even under identical conditions of management the degree of anaemia varies from litter to litter and in this connection it is interesting to note that black pigs are more prone to anaemia than are white pigs. No satisfactory explanation of this has as yet been put forward. There is no doubt that anaemia is much easier to reproduce in the litters of some sows and a genetical factor has been postulated to explain this. It may, however, be a quantitative factor in the amount of iron present in the body at birth. Certainly allowing the sow out every day during the suckling period is not enough to control anaemia though many of you will have noticed how greedily the young pigs will attack the soil adhering to the sow's feet.

It is important to keep in mind the rapid growth of the young pig. Even (mildly) anaemic pigs will, at the end of three weeks, weigh four times their birthweight and at eight weeks their weight will have increased eight-fold. It is also of considerable practical importance to realise that the amount of iron stored in the liver is only a very small part of the total iron present in the body, so that the pig is almost entirely dependent on an extraneous source of iron for its continued sustenance. In one series of observations it was found that the total iron content of the body of the pig at birth averaged 47·2 mg. Of this total 42·2 mg. was found in the circulating blood and only 4·6 mg. in the liver. It is possible, then, that depletion may begin as early as the second day after birth.

Once the young pigs begin to eat food other than milk they are then able to satisfy their iron requirements even in the absence of iron supplements and in this way many outbreaks of anaemia are brought under control naturally. It is what happens in this period before the young pig begins to eat that may determine its future well being. In many cases the degree of anaemia is such that recovery is impossible and death supervenes. At best the pigs may suffer a severe setback and the growth rate be retarded. In comparing weights of pigs at eight weeks of age we have observed a difference of weight between pigs in which anaemia was allowed to develop naturally and those which had access to soil at four days, of anything up to 20 lb. in favour of the anaemia controlled group. In assessing this difference it is not merely a matter of so many extra pounds of pig flesh, but such pigs have a greater resistance to other diseases. Anaemic pigs are more prone to such diseases as piglet influenza, paratyphoid and pneumonias, and there is circumstantial evidence that some at least of the obscure disorders of that little known bacteriological field—the alimentary tract of the pig—have their genesis in an earlier anaemia.

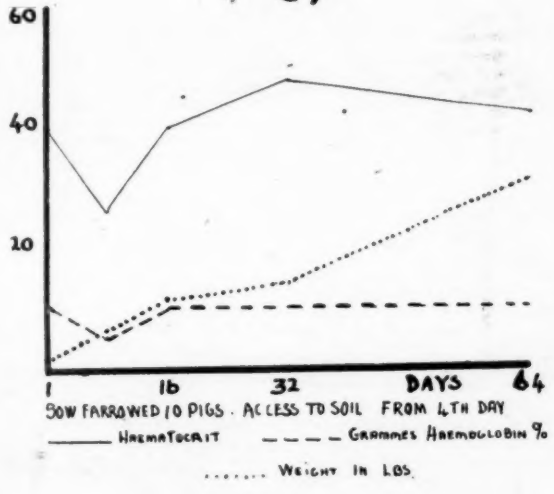
It is not proposed to discuss treatment at any great length. The basis of all treatments is, of course, the supply of iron during the critical period of the first three weeks after birth. By this time the intake of food should provide sufficient iron for the pig's requirements. Experimental evidence recently has been produced to show that the single administration of 0·5 gramme of reduced iron on the seventh day provides adequate control. Where it can be managed a dose of reduced iron on the second, eighth and 15th days would be preferable. Of course, the ideal method of control would be access to pasture.

The following graphs summarise the position. Sow C farrowed ten pigs. These had access to soil from four days (see Graph No. 1) ; even so, there is a marked drop in the haematocrit and haemoglobin readings up to the eighth day. During the second week these values quickly returned to normal and remained at or above birth level up to the 64th day when the final observation was made. Pig C9 at 64 days weighed ten and a half times its weight at birth.

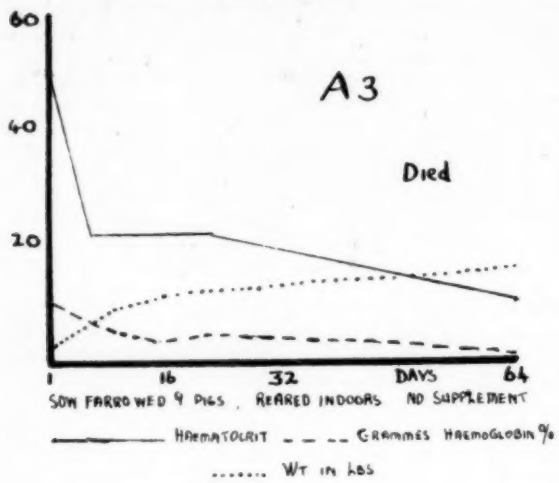
Sow A farrowed nine pigs which were reared indoors without any iron supplement (See Graph No. 2). Pig A3 suffered from acute anaemia and died soon after the 64th day. The haematocrit and haemoglobin curves show that the pig failed to recover normal values after the physiological drop. At 64 days its weight was only five times its weight at birth.

A4, a litter mate of A3, also showed marked signs of anaemia but it survived to weaning. (See Graph No. 3). At 64 days the haemoglobin value in grammes per cent.

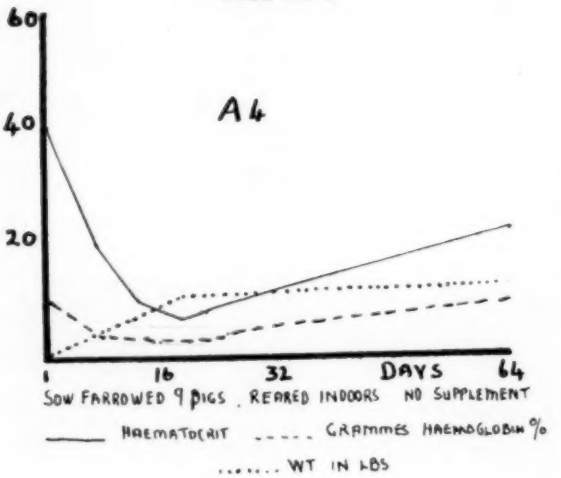
Graph No. 1



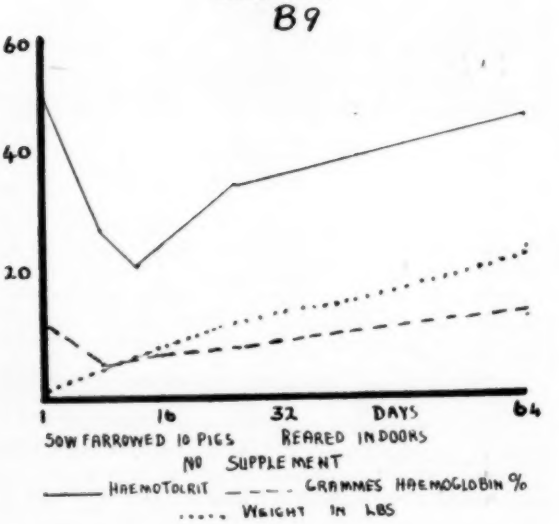
Graph No. 2



Graph No. 3



Graph No. 4



was about equal to the value at birth. The haematocrit level at 64 days was still sub-normal. In 64 days this pig increased its birthweight seven-fold. Four out of nine of this litter died from anaemia.

Sow B farrowed ten pigs three days after litter A was born. Both litters were maintained in adjacent pens under similar management. All ten pigs of litter B were weaned successfully although all showed evidence of a degree of anaemia. (See Graph No. 4). At 64 days B9 had increased its birthweight nine-fold.

TREMBLING IN YOUNG PIGS

Mr. Bolton, M.R.C.V.S., of Cookstown, drew our attention to a peculiar condition affecting a litter of pure bred Saddleback pigs. The whole litter was affected by a spasmodic twitching of the musculature, particularly that controlling the hind quarters. All were affected from birth and three of them died during the first 48 hours.

The spasmodic twitching appeared to be accentuated by excitement or sudden noise, but as the pigs settled down and went to sleep the twitching movement gradually passed off and when the pigs were asleep one could hardly notice anything amiss. The spasms flared up again when the pigs woke up. In some cases the spasms were so violent that the pigs were unable to maintain their balance. No other abnormality was noticed and in spite of the affliction they managed to feed and play with each other like any normal piglets.

One of the pigs was brought to the laboratory for further study. It continued to behave as has been described. It readily learnt to drink out of a dish and it grew as well as any pig under similar circumstances. It was kept under observation for 17 days and during that period there was a distinct improvement in the condition though it was still severely affected when it was destroyed.

It was found that two other litters by the same boar and out of a half bred Saddleback and York Sow were also affected in the same way. In one of these litters there were seven live pigs when seen by us. They were three weeks old and were well grown for their age. It is interesting to note that three orphan pigs of a different breeding had been reared with this litter, but had remained healthy. This second litter was not as severely affected as the previous one, but the owner stated that they had shown a steady improvement since birth. In the first litter mentioned the condition abated as the pigs grew older and by the time they were six weeks old they were practically normal.

The boar in question was a young pure Wessex Saddleback and these were among the first litters got by him. Several other litters of his were seen but these were all normal. We have also ascertained that the boar was normal at birth and nothing of a similar nature was seen in any of his relations. We considered the possibility of a genetical basis for the phenomenon but as there was no blood relationship between the boar and either of the sows it would appear that a simple recessive factor was not involved. In the first litter investigated the affected lot of pigs was the sow's first litter, but in the second case the sow had had a previous normal litter by another boar. [A cine film in colour was shown illustrating this very interesting condition].

There are several records in the literature of this or a similar condition, reported from different countries. Hindmarsh (1937) reported the condition in Australia in a litter from a Tamworth sow and again in the litter of a daughter of this sow. A third lot was affected—the progeny of a Berkshire sow. The same boar was used in each case

Two of these sows subsequently mated to this same boar produced normal litters. In America Nissley (1932) described a similar condition in the progeny of a number of sows when the condition cleared up in two to three weeks. The sows were bred to three different boars and the condition could not be associated with any one boar or group of sows. The author was unable to suggest a cause.

Pagen and Fournier (1934) recorded the condition in Large Whites and in Large White Breton Crosses. They found symptomatic treatment of no avail and considered the condition to be hereditary. When the boar involved was replaced no further cases were seen.

Hughes and Hinman reported its occurrence in two litters at the California Experimental Station. In one Poland China litter ten pigs were born, but only five were alive, and all were affected, while in the other (Duroc Jersey) five out of nine were affected. The condition cleared up after 14 days. The authors did not arrive at any conclusion as to the cause.

Knilans (1936) saw a similar condition in a farm where five out of 12 litters were affected, and about 40 per cent. of the pigs in these five litters showed symptoms. Seven other litters to a different boar all were normal. Two of the sows involved were litter mates and one had produced an affected litter and a normal one.

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Discussion

Mr. Magowan expressed both their indebtedness to Mr. Luke for his excellent paper, and his satisfaction that the Association had devoted the meeting to diseases of the pig, as that animal was becoming more important than ever. He recalled that as far back as 1932, gut oedema had been diagnosed in a pig he had brought to the laboratory. He felt that diet was important in this condition.

Did the skin condition occur in pigs outside? This condition sounded very like what Hutyra and Marek called "soot" in young pigs.

He noticed that trembling had been reported in black or black cross pigs. He appealed to his colleagues to use whatever influence they had to encourage farmers to keep pure bred white pigs only. There was a tendency for indiscriminate crossing with black boars which he felt was all wrong. He suggested we follow the Danes and stick to one breed: he considered that our Large White was suitable in every way for the bacon industry.

Major Williamson: In his experience anaemia appeared to be worse in piggeries facing North and it was usually the best thriving pig which became affected first. The trembling condition might be some defect in the coloured pig

Mr. Bolton had seen oedema mostly in bought-in pigs, and very often the joints were affected. With reference to the trembling condition, about 25 per cent. of the litters from the boar in question showed it, but the piglets all improved as they grew older. In his practice he saw a condition in pigs in which young pigs developed blue ears and eventually the tips sloughed off.

Mr. Wallace asked if the dosage rate of sodium fluoride in the National Veterinary Medical Association booklet was correct. He had noticed that a commercial firm was marketing sodium fluoride, but the dosage rates were 25 per cent. higher than those given in the booklet. He found it difficult to make pigs eat it: could fish meal be used as a vehicle? Also, must the medicated food be fed dry or could it be mixed with skim milk?

With regard to gut oedema: did it often attack only one pig in a litter or always spread to a number of pigs? Did it often occur in pigs over 90 lb. in weight? He had noticed that a drug firm stated that penicillin was of no value in erysipelas, but he considered that he got good results with it in clinical cases.

Did anaemia occur in store pigs—possibly associated with worms—and would treatment for anaemia be of any value in these cases? In his experience the joint condition in bought-in pigs responded to sulphapyridine.

Mr. Gilmore reported a condition commonly seen in sows near or just after farrowing, in which there was high temperature and loss of milk. It responded to sulphapyridine, but calcium injections were of no value. Could Mr. Luke tell him what it was?

Mr. Hobson found that putting pigs suffering from oedema on slops and salts with a run out of doors was of value. Did latent infection exist in swine erysipelas? Recently he had a case in a cull of a litter. After its litter mates had been sold off it refused to eat and about 14 days later it took erysipelas.

Mr. Morgan asked what was the most practical treatment for anaemia in the field.

Mr. D. Houston, after expressing apologies for absence on behalf of Professor Baskett, who was indisposed, said he had had a case of erysipelas in his own pigs in similar circumstances to the case described by Mr. Hobson.

Mr. Adams enquired if penicillin therapy in erysipelas would cut out the risks of a chronic focus developing in the body, *e.g.*, chronic endocarditis?

Mr. Coyle wondered if suckers responded to penicillin in swine erysipelas. Recently he treated several sucking pigs with penicillin, but all died and the last sick pig in the litter he treated with serum and it recovered. The particular outbreak he had in mind had been confirmed by the laboratory.

Mr. Ferguson asked if sodium fluoride produced toxic symptoms in certain circumstances? He had had three different litters all show marked toxic symptoms after dosing. Fortunately however, they all recovered.

The Reply

Mr. Luke, replying, said he agreed with all Mr. Magowan had said about the white pig as a basis for the successful bacon industry. The skin condition had only been seen in pigs reared indoors. With reference to Major Williamson's experience with anaemia, he agreed that exposure would have an adverse effect in pigs already suffering from that malady. The best pig usually suffered more severely as it made greater demands from its diet and would feel the effect of any deficiency more acutely. The joint condition referred to by Mr. Bolton in bought-in pigs was different from oedema and the former would respond to sulphapyridine. Affected pigs had a high temperature. The blue ear condition might be acute paratyphoid infection.

He was interested in Mr. Wallace's remarks but without knowing the pure sodium fluoride content of the preparation concerned it would not be possible to comment on the apparently high dosage recommended by the particular firm in question. He could see no reason why sodium fluoride should not be mixed with fish meal, or the medicated feed mixed with skim milk. Occasionally only one pig in a litter was affected with gut oedema and it was not so common in pigs over 90 lb. in weight. The question of the value of penicillin in swine erysipelas would seem to be one that required clarification.

It was unlikely that anaemia in store pigs would be a simple iron deficiency anaemia but a result of debilitation from some intercurrent cause.

The condition referred to by Mr. Gilmore was allied to puerperal sepsis of the human and might be associated with a septic focus in the body, *e.g.*, a metritis. He was interested in Mr. Hobson's apparent success in treating oedema. Unfortunately, while some litters appeared to respond many failed to show any change after this treatment and deaths continued. The appearance of swine erysipelas in the cull of the litter was interesting. It would be difficult to express an opinion as to whether there had been a latent infection in this case. The ability of the causal organism to lead a saprophytic existence outside the pig's body probably would be sufficient to explain these cases.

He thought that the most practical control of anaemia would depend on the conditions on the farm. He himself was in favour of reduced iron as a prophylactic and as a cure, though in some farms a run out to pasture might be practicable.

The use of an adequate dosage of penicillin might reduce the possible chances of a chronic focus remaining in the body, but in view of the doubts that had been expressed as to the efficiency of penicillin in swine erysipelas the question must remain open.

He had no experience of any toxic symptoms after sodium fluoride apart from the vomiting or scouring referred to earlier, though conceivably such might ensue from inadequate mixing or the use of the chemically pure form of the drug.

BOVINE INFERTILITY *

Bovine Fertility Levels as Ascertained from the Statistics of Annual Production

(R. PHILLIPS, Aberystwyth)

The returns for the sales of surplus calves through the Collecting Centres of the Ministry of Food have given valuable information on fertility levels in bovines. They differ from other sources of information in that they refer to very small discrete areas. These figures are supported by Ministry of Agriculture figures for calf births and they show that in general in this country the births per cow ratio is a satisfactory one and compares favourably with published New Zealand figures. They show progressive improvement since 1945 with a remission corresponding to the severe weather of 1947, but no remissions suggesting waves of infertility. The seasonality of the calvings over the same period has remained practically unchanged.

Two peaks in the monthly rates of calving, one in the spring and one in the autumn, occur in practically every dairying county in Great Britain. The relative sizes range from a high spring calving rate in Kirkcudbright to a high autumn calving rate in Buckinghamshire. This pattern of the calving graphs has been stabilised during recent years except that during the years under review there has been a rise in the October peak and a drop in the March peak resulting from the urge to get a higher proportion of winter milk. It is clear that whatever infertility results from disease in this country, it is insufficient to upset the pattern.

There is a considerable difference between the size of the autumn peaks in various parts of this country; in general there is a gradual rise from west to east. This is true for the sequence of counties from Cornwall to Norfolk and is parallel to the general rise in yield per cow in recorded herds taken county by county. In the counties of the four peninsulas on the western shores it is found that both the Solway peninsula and the South-Western peninsula conform with the general pattern of a rise in the autumn peak from west to east, but that in the West Wales and North Wales peninsulas the order is reversed, the western counties being at a higher level than their neighbours to the east. These differences in percentages remain from year to year and the sequence of changes from Haverfordwest (West Pembrokeshire) to Llandovery (East Carmarthenshire) only 50 miles away, through five intervening Collecting Centres, is so gradual that the overruling influence must be beyond the control of husbandry. The East Carmarthen dairying area has thus failed to obtain a high rate of autumn calving with the result that the proportion of winter milk produced remains practically the same as it was in 1939. What may therefore be termed winter inferility in this part of the country is nothing more than the overruling effect of natural conditions on the artificial conditions of husbandry. Before it is possible to overcome and control this low rate of winter conceptions in bovines in this area it is necessary to understand how climate affects the animal directly, or indirectly through its food supplies.

Wastage from the dairy herds of this country has been measured by various investigators and is now estimated at about 25 to 30 per cent. of the dairy cow population. Infertility as a reason for the disposal of cows has been estimated as being of small dimensions. Howell at Aberystwyth in an eight-year survey found it to be 4·4 per cent. for the whole period, or nearly one-half per cent. per annum.

The conclusions from the statistical examination of certain aspects of the problems of fertility levels in bovines must be that disease leading to infertility is not a serious problem because it does not appear to upset the pattern of the seasonality of calvings and does not cause fluctuations in the percentage calf crop. On the other hand, what appears as winter infertility is the result of the overruling effects of natural conditions of the environment upon the artificial conditions of husbandry.

Suppression of Oestrus in Cattle

(F. A. LAING, Bristol)

The syndrome known as "winter infertility" appears to occur in all the countries of the temperate zone of the Northern Hemisphere where breeding of cattle in winter is attempted. In Britain it is more common and tends to its severer forms in the colder parts of the country, and in all parts in particularly cold winters. It occurs in good quality animals lactating at high levels, and in good physical condition, and also in animals on starvation rations. It tends to resolve spontaneously in the spring.

There are three main factors which may be aetiologically important, namely, light, nutritional status and external temperature.

It is known that inanition will depress pituitary function in small animals. In cattle there is little reliable specific information on this point, although it has always been believed to be so. Nor is there any information regarding specific dietary deficiencies, except those of phosphorus (Theiler and Green, 1932) and copper (Blakemore, unpublished). In both these cases the infertility is only one symptom of a readily recognisable syndrome which is distinct from winter infertility. Light is known to have an important direct effect on reproductive periodicity in small animals (Marshall, 1938), sheep (Yates, 1947) and mares (Burkhardt, 1947), and the tendency to spontaneous resolution after the animals have been exposed to increasing daylight for two months or more is a striking feature of winter infertility (Mercier & Salisbury, 1947). Extreme temperature has usually been looked upon as of subsidiary importance (Marshall, 1938), but the greater prevalence of the condition in cold winters, and observations made by Phillips in Wales (1947) tend to suggest that this is not so.

With these factors in mind experiments were commenced in the winter of 1947-48 to determine their varying aetiological effects. Twenty-four commercial Dairy Shorthorn maiden heifers were used. Eight were fed on a sub-maintenance ration, eight were fed a maintenance ration, while eight others were fed a maintenance ration and exposed to artificial light in addition to normal daylight. The experiment was started in December and the light increments commenced on the shortest day and adjusted so that by the end of February the light-treated group were exposed to a total light period equal to that of mid-June. The animals in all groups were inseminated as they were seen in oestrus. All were examined at weekly intervals to determine what changes occurred in the ovaries. At the beginning of the experiment all 24 animals were having oestrous cycles. The maintenance group, which were considered to be controls, did not deteriorate in condition during the experiment. There was progressive loss of weight in the sub-maintenance group, and a more marked and rapid loss of weight in the light-treated group. It was apparent that the latter's rations were not sufficient for their maintenance

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because of the increased physical activity induced by the disturbance of the extra light.

A major proportion of animals in the sub-maintenance group and in the light-treated group became completely anoestrous. Reproduction was most efficient in the control group, but here there was a tendency to suboestrum, and evidence of ova being fertilised but the embryos resorbing after implantation. All the features of winter infertility except delayed ovulation were observed in all three groups.

It was concluded that the disease could occur as the result of a deficient diet, that the deficiency might be a simple general quantitative one, or one of a specific dietary factor, and that on such a diet light exposure equal to that of mid-June could have no favourable effect on fertility. It was further concluded that a diet sufficient to prevent loss of weight was not sufficient to allow full reproductive efficiency.

Following this experiment, it was decided to attempt to determine the effect of light increments on animals fed a diet which allowed a progressive increase in weight. The experiment of 1947-8 was repeated in the winter of 1948-49, but modified in so far as two groups of eight heifers were used, and both were fed a ration of hay, concentrates and a mineral mixture designed to give a gradual increase in weight throughout the period. One group was exposed to increasing light as in the previous year.

The reproductive performance was the same in both groups. It thus appeared that the duration of light to which cattle are exposed does not play a part in the causation of winter infertility, but that the problem is entirely a nutritional one.

Further experiments are in progress to determine whether oestrogenic substances in spring grass are concerned with recovery.

The Most Prevalent Form of Infertility Among Dairy Cattle in the Midlands To-day

(I. G. SHAW, Tattenhall)

Occasionally herd infertility is encountered for which no infectious agent can be incriminated, nor any of the usual lesions found. Sometimes it clears up spontaneously in a few months, while in others the condition varies little in years. This category of infertility is the most common type with which I have to deal, and the following herd was typical.

A farm which had supported a flying herd, with normal fertility, changed hands and was stocked with 80 Ayrshires and followers purchased from many sources. In accordance with the prevailing agricultural policy, ploughing up, liming, application of fertilisers and reseeding was vigorously pursued. The conception rate fell rapidly despite the usual forms of treatment, use of several bulls and as a last resort artificial insemination using semen from the local A.I. centre. Both heifers and cows were affected, and clinical examination of the females showed that the normal functional changes in the ovary and uterus did not occur. There appeared to be no relation between one cycle and the next and calving frequency became irregular.

The history of both sexes before purchase was normal as was their subsequent history when sold to local farmers. Newly purchased bulls when turned out with heifers gave a better result for the first few days than subsequently. Twenty-five per cent. of the herd was replaced annually on account of infertility and poor milk yield. All animals appeared in good health throughout the year.

The water had a hardness of 68 parts per 100,000 $CaCO_3$, representing a probable intake of 24 grammes of $CaCO_3$. Manganese levels in herbage were slightly low but administration of manganese by intravenous injection, drenching and spraying pastures did not appear to influence the conception rate. A general improvement in the conception rate corresponded with decreased liming.

In many other herds similar conditions and clinical manifestations exist. It is noteworthy that this type of infertility is most often encountered in Ayrshire herds although this breed is third in order of preponderance in the area.

There is a tendency to-day for reputable stock owners to overestimate the feed value of home-grown feedingstuffs; dried grass and hay with a crude protein content of 5·5 per cent. and 5·7 per cent. respectively have been known to be fed as high quality products. I submit that the relation of nutritional and environmental factors to reproductive efficiency of dairy cattle has not received its due proportion of consideration.

Bacteriological Aspects

(A. W. STABLEFORTH, Weybridge)

A large variety of organisms have been isolated from the male or female genital tract at one time or another (Weitz, 1947, Aziz-ud-Din and earlier authors). Most are equally commonly present in the normal and abnormal and are of no pathological importance. Near the border line are some which are more common in the abnormal, *e.g.*, haemolytic staphylococci, to which Laing ascribed one outbreak, or certain streptococci (*e.g.*, Webster in Australia). Some other organisms are more worthy of attention:—

C. pyogenes for years has been shown to be associated with infertility. It is found in a high proportion of cases of purulent metritis and causes deep-seated lesions with destruction of mucous membrane and cotyledons. It has long been suspected that infection is spread by the bull but the first extensive work on this was done by Hancock and Kelly (1947) who examined 150 specimens from 70 bulls in 40 herds and found that semen from 25 bulls in 16 herds was infected. Many had good quality semen and caused no trouble but from their experience in eight herds these workers concluded that there is considerable evidence that the use of bulls with *C. pyogenes* in their semen is frequently associated with pathological changes in females to which they are mated.

Vibrio foetus, originally described by Stockman and M'Fadyean as a cause of abortion in sheep, was first reported in cattle by Smith and since then has been found in aborted foetuses by many workers in this and other countries. It is only in recent years that it has been incriminated as a cause of infertility. Plastridge and his co-workers (1948, 1949) when investigating this organism as a cause of abortion noted that the observed abortions were earlier on the average than those due to *Br. abortus*, though later than the usual time with *Trichomonas foetus*, and suggested that early vibrionic abortion might be more common than the figures indicated because it would often be overlooked. The Dutch workers, Sjollema, Stegenga and Terpstra (1949) in their studies of what is called enzootic sterility in 62 herds in Holland, concluded that *V. foetus* causes a venereal disease, transmitted by service or artificial insemination, and that infection is followed by mild catarrhal inflammation of the cervix and uterus with failure to conceive or early death of the fertilised ovum with return to service at three weeks or later. The infection may extend to late in pregnancy but is usually short. The quality of the bull's semen is not as a rule affected and infected females develop a tolerance in a few months and then settle. Agglutinins are usually found in the blood in late abortions but are often at low titre or absent in cows which return early. Using

Pierce's method for *Trichomonas foetus* infection they showed agglutinins for *V. foetus* were present in the vaginal mucus of a large proportion of affected animals or those served by infected bulls but not in normal animals. Lawson's observations in Great Britain lead him to think that *V. foetus* may play an important part in infertility here.

Pleuro-pneumonia-like Organisms.—In 1947, Edward, Hancock and Hignett reported the isolation of organisms of the pleuro-pneumonia group from the bovine genital tract, using special selective media containing thallium acetate and penicillin. They were isolated from 18 out of 64 cows, all of which were from herds with a long history of infertility and showed some inflammatory changes, and also from the semen of six bulls, one of which had a seminal vesiculitis. In one herd, 12 out of 17 females examined were positive and both of two bulls. Abnormalities recorded include cervicitis, bursitis and rarely, salpingitis ; and in isolated cases a scanty purulent vaginal discharge after service. Semen was normal. No other bacteria could be isolated except *C. pyogenes* in one herd. No cellular inclusions were found. The authors discuss the possible pathogenic role of the pleuro-pneumonia-like organisms in infertility but are cautious in drawing conclusions because in human beings similar organisms have been reported in normal people.

Nielsen (1949) when discussing what is called " contagious enzootic sterility " in Denmark also refers to pleuro-pneumonia-like organisms. The disease he describes has, he says, become more and more common in recent years and is transmitted by service or artificial insemination, every cow developing a purulent discharge with failure to conceive. Pleuro-pneumonia-like organisms have been isolated from uterine material and also from the semen of a bull (Rasbeck and Szabo). Neilsen says " we cannot yet express a definite opinion as to the real importance of these organisms in sterility but we suspect it may be very great." No other bacteria could be incriminated in these cases. *C. pyogenes* and other easily isolated bacteria would presumably have been found if present. No specific reference is made to a search for *Vibrio foetus*.

Brucellosis was at one time one of the more important causes of infertility from its own effects and those of infection which followed it, but the widespread use of S.19 has reduced its importance to a low level.

M. tuberculosis produces lesions which obviously make conception or pregnancy impossible. It is not, however, a common cause of infertility as judged by the frequency of *post-mortem* lesions of the genital tract. Recognition of the possibility of its presence with or without obvious signs is, however, important because of the necessity of strict precautions to prevent its transfer from one cow or herd to another.

Two points are worthy of mention. Firstly, the Danish workers make no reference to *V. foetus* whilst the Dutch workers make none to pleuro-pneumonia-like organisms. This, of course, is what happens in a developing field, but it emphasises the desirablity of comprehensive studies. The second point is that even in infertility associated with one or other kind of bacterium, other factors may be concerned. Thus we know that in some herds a *C. pyogenes* infected bull causes no trouble, that a purulent *C. pyogenes* exudate may disappear quite quickly if the oestrus cycle is resumed and that a calf may at times be conceived and carried normally in spite of a persistent genital infection with *C. pyogenes*. Such considerations and the fact that enzootic or herd infertility of clinically similar type has been ascribed to different organisms in different places or countries, makes it necessary, not only to make a comprehensive bacterial examination but to bear in mind that factors of a physiological, hormonal or nutritional nature may be fundamental or accessory, and should be put to test in experiment and practice.

Diagnosis, Epidemiology and Control of Trichomoniasis

(A. E. PIERCE and H. P. HARDING, Weybridge)

Diagnosis.—The disease is suspected in herds with a history of early abortions or irregular returns to service, and occasionally in those with a vague history of infertility.

In the bull very good results have been obtained by examination of sheath washings. The apparatus consists of a suitable bottle, a Burroughs Wellcome flutter valve apparatus, and a glass end piece made either from a $\frac{3}{8}$ inch test tube or preferably from gauge glass tubing of the same diameter. About 100 c.c. of 0·85 per cent. saline in glass distilled water (the exact strength of the saline being very important) with 2 per cent. glucose as an optional extra is run into the sheath by gravity, massaged vigorously over the glans penis and returned to the bottle—all without touching the preputial hairs. Usually little restraint is needed, most bulls showing considerable indifference to the interference. The washing is taken back to the laboratory, examined within four hours, the deposit following centrifuging (2,000 r.p.m. for two minutes) being examined under a cover slip with the two-thirds objective and a high power (X15) eyepiece. Several slides should be examined systematically for up to a total of 30 minutes before accepting a negative diagnosis. Where a suspected Trichomonad is seen under the low power, it must be identified under the one-sixth, the presence of a large undulating membrane being sufficient for positive diagnosis.

In the cow the parasite is more frequently detected in the thin mucoid type of vaginal discharge than in the thick purulent type ; it is absent at and immediately following oestrus, and may be very difficult to find in old-standing infections. They are not easy to find without an adequate microscope light. The loss of motility which renders their detection so difficult appears to be due to antibodies which appear in the vagina earlier than in the uterus. Cultural methods, in which streptomycin is used to suppress bacteria, have been of some use. An agglutination test on vaginal mucus, testing for the two types, Manley and Belfast, has also been of some value.

Epidemiology.—As spread is purely venereal, the disease is likely to be serious only in areas where the herds are small and community bulls are employed. In other areas it is likely to be confined to individual herds.

Control.—Full education of the farming community is essential. Treatment of the cow is by sexual rest ; four oestral periods is usually but not always long enough. Treatment with the usual irrigations does little to hasten the process of recovery. Only after A.I. has been used to get a normal full-time calf from every animal in the herd is it reasonably safe to return to normal mating, and even then breakdowns may occur. In the ordinary bull treatment is not worth attempting. Intravenous iodine seems to be promising but better therapeutic agents for systemic injection are required. The emphasis in all control measures should be on prevention ; with a full understanding of the disease, spread should easily be prevented. The improved sheath washing technique should help by aiding in prompt diagnosis.

Changes in the Fallopian Tubes of the Bovine as a Cause of Sterility

(H. J. Cembrowicz, Ilminister)

Clinical, *post-mortem*, histological and bacteriological examination of 1,030 cattle at two Cambridge abattoirs revealed disease of the oviducts in 2·0 per cent. of 300 maiden heifers, and in 8·9 per cent. of 730 cows. The findings were as follows:—

(1) The mucosa of the oviducts showed cyclical changes corresponding to those in the uterus.

(2) Cysts in the mesovarium cannot be regarded as a serious cause of sterility. They were found, usually on one side, in 17 animals.

(3) Cysts were found inside the oviducts in one heifer and 12 cows (1·6 per cent.). In three cases they were bilateral, causing complete obstruction and sterility; they were usually of inflammatory origin.

(4) Hydrosalpinx occurred in 15 cases (0·3 per cent. in heifers and 1·9 per cent. in cows). It was usually due to ascending infection.

(5) Adhesions were found in the adnexae of 2·52 per cent. of the subjects; they were an important clinical feature resulting from local irritation or extension of inflammatory changes in the oviducts and peritoneum.

(6) In chronic uterine conditions such as endometritis purulenta and pyometra, 70 per cent. of affected animals showed histological evidence of involvement of the ducts.

(7) Oviducts in connection with a series of cystic ovaries showed no pathological changes, the epithelium being in a similar state to that of oestrus.

(8) The majority of cases of disease of the Fallopian tubes were not due to specific infection; the flora was usually mixed and the organisms were not highly virulent.

(9) Tuberculosis affected the genital organs in 2·5 per cent. of the cows. There was a strict relationship between the disease of the uterus and oviducts and examples were found of descending and haematogenous infection. The eradication of tuberculosis must be considered in any scheme for reducing the incidence of bovine sterility.

Clinical Aspects of Infertility in the Bull

(G. H. Arthur, Streatley)

Impotence, or inability to Copulate.—Bulls become conditioned to the method of management at service and the environment of the service yard and if these are altered, particularly by transfer to another farm, there may be a disinclination to mate. Young bulls may play with the oestrous cow in an asexual way but they usually acquire sexual desire if persevered with. Older bulls, especially those of beef breeds in fat condition, may become sluggish or more discriminating in their sexual behaviour. Conditions which cause pain during movement, such as reticulitis, may discourage a bull. Hypoplasia of the external genital organs with insufficient protusion of the penis to effect coitus is sometimes seen in the unbred bull when first put to service. The prognosis is favourable since the young animal gradually develops until it can serve normally.

Acquired phimosis is a more serious condition, and in areas with a high incidence of bovine tuberculosis a considerable proportion are probably due to tuberculosis of the penis and prepuce. Infections following injury may result in granuloma formation with adhesions of penis to prepuce and inability to protrude the penis. Neoplasia, more commonly fibromata and papillomata may impede protrusion.

Seminal Deficiency.—The assessment of seminal deficiency is a laboratory study but the semen should be examined for initial motility and general appearance at the farm, immediately after collection. At the same time, breeding records should be consulted. Specimens which result from a definite ejaculatory thrust should be examined.

The majority of cases of infertility in the bull are due to testicular lesions such as orchitis, hypoplasia and degenerative atrophy of the spermatic epithelium.

Swedish workers have investigated the changes which occur in the semen following interference with the scrotal thermo-regulatory function. They found that whereas degeneration of the epithelium occurred in a matter of days, with changes in semen following some eleven days later, regeneration could occur following removal of the deleterious influence but might occupy months. It is known that in normal testicles physiological fluctuations in the activity of different parts of the same seminiferous tubule may be seen histologically, one part being actively spermatogenic and another part quiescent. The observation that in nearly all fertile bulls some abnormal sperms occur may be related to this and pathological degeneration may occur as an exaggeration of this physiological process.

Seminal degeneration will be met most frequently in the bull which has worked and sired calves, but which has apparently become sterile. Clinical examination will probably be negative and sexual desire will be found to be normal. The soundest procedure would seem to be to try to rectify any errors in diet or management, or hormone deficiency, and take samples of semen at fortnightly intervals. If there is no improvement in motility, or sperm count, or any decrease in abnormals in say two months, then it is probable the bull will be permanently sterile.

Hypoplasia is an arrest in the division and differentiation of the epithelial cells lining the seminiferous tubules, often associated with clinical reduction in size of the testicles. It occurs in young bulls put to arduous service and is generally detected when a majority of cows return to service. The volume of semen is often small and its density low, motility may be poor or absent and there may be a high proportion of abnormal sperm cells: aspermia may be present. If the animal is a valuable one the best advice is to withdraw from service, feed adequately, give regular exercise and to re-examine after intervals of a month. There seems little doubt that many young bulls are put to work too early and that the spermatogenic tissue may not keep pace with service demands.

The most significant semen qualities seem to be density, motility, percentage of abnormals and viability at low temperature. No single quality is a reliable criterion of fertility, but the best is initial motility. Occasionally, however, a bull with poor motility is consistently fertile. The average count for fertile bulls in my observations was just over 1 million per cubic millimetre, but many samples with a count of between 300,000 to 600,000 were fertile. On the other hand, I have never known a sample with less than 300,000 cause conception, and where such counts have been found the bull in question has been sterile, at least temporarily. In fertile bulls the percentage of abnormals averaged under 10. In the majority of cases where I was satisfied from service records and on examination of the cows that a bull was sterile the abnormal count exceeded 20 per cent. Abnormal count alone, however, is not a reliable guide to fertility, as was shown by the successful use of samples with 46, 32, and 19 per cent. abnormals.

Infertility in a Bull in Service at an Artificial Insemination Centre

(L. E. A. Rowson, Cambridge)

A bull, which will be referred to here as Bull " A," was withdrawn from service on account of a progressive deterioration in his conception rate. Records showed that whereas a fertile bull (" B ") had been obtaining a normal conception rate on cows not previously inseminated with bull " A " semen, there was a marked drop in his conception rate on cows on which bull " A " had previously been used. Information was obtained on 75 per cent. of the cows inseminated by bull " A " by visiting the farms and finding out what happened to each individual cow. Thirty-two, or 11 per cent., of 291 cows inseminated actually calved to the first insemination by bull " A." Including presumed pregnancies, 41, or 14 per cent., could be considered successful inseminations. When the fertile bull " B " was used to inseminate 166 cows previously inseminated by bull " A," only 24, or 14 per cent., became pregnant to bull " B " at the first insemination following bull " A." Bull " B " was also used during the same period with the same semen samples on cows not previously inseminated by Bull " A," and, on a random sample of 166 first inseminations, 45 per cent. calved to the first service.

This evidence of infertility in Bull " A " was a surprise because samples of his semen, although not outstanding, were reasonably good and stored excellently at 5° C., showing good activity after four days, with no morphological abnormalities; no significant bacteria were found, sheath washings failed to reveal any trichomonads, and the cows inseminated appeared perfectly healthy.

As time went on an astonishing fact was brought to light. Out of 205 cows which had been inseminated by bull " A," no less than 114 were either still barren one year after insemination by bull " A " or had already been slaughtered as sterile.

A similar history in another bull is now under investigation. There is, in our opinion, little room for doubt that a condition occurs in bulls about which little is yet known, and which can be transmitted to cows by artificial insemination. Particular care should be taken with every new bull introduced into the centre, especially if his initial conception rate appears rather low.

R. S. R.

MILK (SPECIAL DESIGNATION) REGULATIONS

The Minister of Food, the Minister of Health and the Minister of Agriculture and Fisheries announce that the following Regulations have been made to come into force on March 26th, 1950:—

(1) Milk (Special Designation) (Pasteurised and Sterilised Milk) (Amendment) Regulations, 1950 (made jointly by the Minister of Health and the Minister of Food); and

(2) Milk (Special Designation) (Raw Milk) (Amendment) Regulations, 1950 (made jointly by the Minister of Health, the Minister of Agriculture and Fisheries, and the Minister of Food).

The effects of the amending Regulations are:—

(1) A small technical error in the section of the Milk (Special Designation) (Pasteurised and Sterilised Milk) Regulations dealing with the method of carrying out the turbidity test for sterilised milk is corrected; and

(2) Provision is made in both sets of Regulations for the use of sterilised glass-distilled water and sterilised stoppered flasks in connection with the methylene blue test.

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Weekly Wisdom

"*. . . It does not take a great mind to make simple things complicated, but a very great mind to make complicated things simple. . . .*"—Charburough, 15 B.C.

THE VETERINARY RECORD

April 1, 1950

BOVINE INFERTILITY

THE abstract of the general discussion on infertility by the Association of Veterinary Teachers and Research Workers, which appears in this issue, makes it possible to see the subject in a fresh perspective and to take stock of the new knowledge which has accumulated in the past few years. Among the workers concerned there is now growing an appreciation of the nature, extent and complexity of the problem of infertility. A feeling of confidence is gaining ground that the major factors which are interfering appreciably with farm economy are now coming under proper investigation.

The phenomenon of winter infertility, aptly referred to in the discussion as the failure of management to overcome limitations in the artificial environment, is an outstanding economic problem. An understanding of the true cause of winter anoestrus is fundamental to its solution.

Much of the remainder of the problem would appear to be the concern of the bacteriologist, or microbiologist. While emphasis has passed from *Br. abortus* as a cause of bovine infertility, and some of the uncertainties concerning the rôle of *Trichomonas foetus* have diminished, there appears to be evidence that tuberculosis may be implicated in a small minority of cases. Mention is made of the danger of transport of this organism from case to case or from farm to farm by veterinary workers. The rôle of *C. pyogenes* is uncertain. Pleuro-pneumonia-like organisms also have been suggested as possible causes of herd infertility. Furthermore, recent investigations show that *V. foetus*, an organism which is not detected by the bacteriologist unless a special technique is employed, is the aetiological agent in some herds. An intensification of research into microbiological agents associated with infertility would appear to be essential for progress in the near future.

Tuberculosis control—happily spreading so rapidly throughout the country by the voluntary efforts of the farmers—will reduce the incidence of infertility from that small minority of cases due to genital infection with tuberculosis and will contribute in a much wider field to the solution of the nutritional problems which it is suggested play an important part, particularly in winter infertility.

In many herds in which infertility is a problem, the pattern is not that of winter infertility. It is suggested that in some of these the underlying cause may be a deficiency of, or interference with the absorption of, a trace element. The influence of hereditary factors also must be considered. The discussion suggests that the rational procedure in investigating infertility problems is first to eliminate micro-organisms as a possible cause.

It is gratifying to note the contribution which is being made to the elucidation of the problem by the veterinary surgeons at the A.I. Centres, but more could be done. Further advances in the technique of the examination of semen with a view to assessing its fertilisation value are of major importance and can well form a programme of intense investigation within the province of A.I. officers, who with the control of the bulls and the opportunity for study of records, have a unique chance for really assessing the rôle of the bull in the causation of infertility.

CLINICAL COMMUNICATION

TRILENE ANAESTHESIA IN SMALL-ANIMAL SURGERY

JOAN O. JOSHUA, M.R.C.V.S.

FINCHLEY, N.3

In view of the absence of any reports in this country on the use of trichloroethylene, "Trilene" (I.C.P.), as a general anaesthetic in small animals, and in the light of divergent opinions as to its use, the following note may be helpful. In Eire Heney has recorded its satisfactory use in dogs, cats, pigs and birds.

Since the author considers that in the majority of cases intravenous barbiturates are the anaesthetics of choice in the dog, this article refers mainly to inhalation anaesthesia in the cat, but contains reference to the use of Trilene in a small number of selected surgical cases in the dog.

CATS

To date, Trilene has been used in 113 cases, the majority being female kittens presented for ovarohysterectomy. The series comprised 94 kittens (including five Siamese) and 19 adult cats between the ages of ten months and 14 years; of the adults three were Siamese, two adult females spayed when four to five weeks pregnant, and one tail amputation.

Method.—Trilene has been used in these cases as the sole anaesthetic agent. It is used in the apparatus as recommended by Wright for ether anaesthesia, *i.e.*, oxygen is bubbled through the Trilene; oxygen with 5 per cent. carbon dioxide was tried but was not so satisfactory. The only modification found necessary is that the bottle containing the Trilene should be immersed in a hot water bath throughout. Trilene has the advantage over ether that when mixed with air it is not inflammable, and with oxygen is only so at relatively high temperatures.

Induction.—The oxygen is bubbled through the Trilene at a faster rate than that adopted for ether/oxygen anaesthesia. Induction is slightly slower than in the case of ether, about a half to two minutes longer being required to obtain surgical anaesthesia. Voluntary breath-holding occurs in a proportion of cases, but rather less frequently than with ether; salivation is also less in most subjects.

There is a tendency to narcotic excitement in about 50 per cent. subjects, but this is only occasionally of a violent nature. When surgical anaesthesia is achieved it is maintained at an even depth with little tendency to deepen, and in no case has anaesthesia progressed to an alarming depth. On the contrary, it is essential to ascertain that a plane of surgical anaesthesia has been attained as it is not uncommon for the cat to remain at a level of medium to deep narcosis at which analgesia is so good that superficial surgical interferences (*e.g.*, removal of skin tumours, incision of abscesses, etc.) may be carried out confidently, but which is not sufficient for entrance of the peritoneal cavity. In no case have respirations given any cause for anxiety, a deep, even rhythm being maintained, even in the Siamese cat, which is notorious for its idiosyncrasy to other forms of inhalation anaesthesia.

Recovery.—Recovery is rapid, occasionally associated with some excitement, and with a tendency for the cat to remain recumbent in a state of light narcosis or hypnosis rather longer than is usual following ether. Vomiting has been noted in a few cases. No depression follows recovery and most cats will eat readily within six hours of anaesthesia.

As has already been noted, analgesia in the plane of medium to deep narcosis is excellent, which renders this agent particularly suitable for superficial operations.

In the plane of surgical anaesthesia muscular relaxation is most satisfactory; in this plane clonic spasms of the limbs or head and neck may occur, which, while disconcerting to the observer, prove to interfere little or not at all with the operator.

One fatality only has occurred and that in a young adult tom cat which was presented and operation decided upon without opportunity for preparation; in this case violent narcotic excitement occurred followed immediately by cardiac failure, probably due in part to pressure from a full stomach. In no case has respiratory failure occurred.

In one case also, we failed to achieve anaesthesia; this was in an old cat and it is probably unfair to blame the Trilene as time was a factor in this case and a change was made to ether/chloroform mixture on grounds of expediency.

To sum up:—In the cat Trilene can be used regularly for the induction and maintenance of anaesthesia. In its non-inflammability, ability to produce a useful narcotic/analgesic state, excellent muscle relaxation, absence of idiosyncrasy in the Siamese cat, and lack of depressant effect on the respiratory centre it has advantages over ether. On the other hand, disadvantages include lower volatility, slightly increased induction time, tendency for transient narcotic excitement to occur, and the slight movement of the extremities during surgical anaesthesia.

DOGS

Trilene has been used in six dogs only, and in no case has it been the sole anaesthetic agent.

The following are the cases:—

1. Thirteen-year-old Scottish Terrier, m.

Morphine narcosis, deepened to anaesthesia by Trilene. Operation of castration and amputation of the scrotum performed. Very satisfactory.

2. Fourteen-year-old Wire Fox Terrier, m.

This dog was considered to be a very bad anaesthetic risk for a variety of reasons. Light pentothal anaesthesia was induced; maintenance by Trilene. Operation for extensive anal adenomata performed. This dog died about 12 hours after operation, having made a satisfactory recovery from anaesthesia. The surgical risk was deemed to be so great in this case that the maintenance of anaesthesia alone was considered to be to the credit of Trilene.

3. Ten-year-old Scottish Terrier, f.

Trilene anaesthesia superimposed on morphine/hyoscine medium narcosis, for the removal of two neoplasms. Very satisfactory.

4. Seven-year-old mongrel, m.

Trilene anaesthesia superimposed on light morphine narcosis. Reduction and casting of fractured metacarpals carried out. Very satisfactory analgesia and muscle relaxation.

5. Twelve-year-old Scottish Terrier, m.

Trilene anaesthesia superimposed on light morphine narcosis. Castration and removal of several melanomata carried out. Very satisfactory.

6 Two- to Three-year-old Dachshund, f.

Medium depth morphine/hyoscine narcosis reinforced by Trilene to full surgical anaesthesia for the performance of Caesarean hysterotomy proved very satisfactory.

In all cases induction was smooth, analgesia excellent, muscle relaxation in Case 6 (the only abdominal interference) very good, and respiratory rhythm in all subjects was maintained satisfactorily without anxiety.

SUMMARY

Trilene has been used to induce and maintain anaesthesia in 113 cats ; one fatality and one failure to attain an anaesthetic plane were encountered. The disadvantages and advantages of Trilene as compared with ether are discussed. A limited number of cases in dogs is described, in one of which Trilene was used only to maintain anaesthesia ; in the remaining five Trilene anaesthesia was induced following pre-narcosis.

Acknowledgments.—I am indebted to my surgery assistant, Miss Betty Smith, who has shared my anxiety and lightened my responsibility during the trial period of an unfamiliar anaesthetic agent, and for her careful observation of many of the patients during the recovery stage and her comments thereon. I am also indebted to Imperial Chemical (Pharmaceuticals), Ltd., for supplying me with Trilene for the earlier part of this work.

REFERENCE

HENEY, J. W. (1947.) *Irish Vet. J.* **1.** 73.

ABSTRACTS

[The Breeding Season of the Sheep with particular reference to its Modification by Artificial Means, using Light. YEATES, N. T. M. (1949.) *J. Agric. Sci.* **39.** 1–43.]

Numerous experiments are described in which the effect of the light environment on the seasonal rhythmicity of the sexual activity of sheep was studied. The main investigation was centred on a group of 24 ewes which were divided into a control and experimental group. The control group was placed in a pen to which natural daylight had easy access through many windows and doors. The experimental group was housed in a pen which could be well lit by electric light and from which all daylight could be excluded. From October 15th the experimental group was submitted to daily increasing increments of light during the shortening days of the year, but when the days began to lengthen again the light was gradually decreased, black-out conditions being imposed when necessary. In short, the experimental group was exposed to the summer duration of light in winter and vice versa. Vasectomised rams were used to detect ewes coming into oestrus. The sheep in the experimental group came into oestrus in early summer, were mated and lambed in the autumn. It was established that the onset of the sexual season is a response to decreasing daily amounts of light and occurs 13–16 weeks after the change from increasing to decreasing length of day. Further, the cessation of the sexual season is a response to increasing daily amounts of light and occurs 14–15 weeks after the change from decreasing to increasing length of day.

The length of the di-oestrous period and the duration of pregnancy were unaffected by the artificial reversal of the sexual season.

The author discusses at considerable length the physiological significance of these findings. Concerning any practical applications, he considers these at present somewhat limited since the housing of sheep would be involved. The results, however, help to explain the conflicting reports of the responses of British breeds of sheep transported at different times of the year to the southern hemisphere. It is suggested that the best time to export ewes from Britain should be as soon as possible after the autumnal equinox, say, as soon as pregnancy could be confirmed in October. In this way the ewes would not be subjected to any sudden change in light. They would lamb in February and, under the influence of decreasing daily amounts of light, should come into oestrus again in May or June, thus adjusting their mating season to the usual times in the southern hemisphere.

A. T. C.

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[Isolation of Salmonellae from Dogs, Cats and Pigeons. CRUICKSHANK, J. C., & SMITH, H. W. (1949.) *Brit. Med. J.* No. 4639. 1254–1258.]

The object of the work reported here has been to assess the prevalence of salmonella infection in dogs, cats and pigeons in London. Five hundred faeces samples were taken from dogs, of which 437 were obtained from a large kennel for the collection of stray dogs and 63 were obtained from the streets in various districts. Five of the samples (1 per cent.) contained salmonella ; two were *Sal. newport*, two were *Sal. typhimurium*, and one strain was of doubtful identity.

Of 500 feline faeces samples, 458 were from destroyed, unwanted cats, and 42 from healthy live cats at the Royal Veterinary College. From seven specimens, salmonellae were recovered—a frequency of 1·4 per cent.—the organisms being *Sal. typhimurium* (three specimens), *Sal. anatum* (two specimens), *Sal. montevideo* and *Sal. paratyphi B*.

From 133 samples of pigeon faeces, most of which were collected in Trafalgar Square, three cultures of *Sal. typhimurium* were isolated—a frequency of 2·25 per cent.

The importance of these findings lies in the fact that the salmonella types isolated are among those most commonly responsible for food poisoning in man. *Sal. paratyphi B*, here recorded for the first time as being isolated from a cat, is, of course, responsible for enteric fever in man.

The editorial comment on this article points out that apparently healthy animals may be carriers of salmonellae pathogenic to man and that dogs, cats and pigeons must be considered as possible sources of infection to man. The finding of *Sal. paratyphi B* in feline faeces together with previous accounts by other workers of its presence in canine faeces form the only exceptions to the rule that a human source must be sought in cases of the usual forms of enteric fever.

I. W. J.

ATTESTATION IN SCOTLAND

"Sir James Denby Roberts told the Association of Certified and T.T. Milk Producers at a meeting in Glasgow last week," reports the *Farmer and Stock-breeder* in its issue of March 21st, "that at the end of 1949 there were 12,000 attested herds in Scotland, with 600,000 head of cattle. That represented 38 per cent. of the total cattle population, and was, he thought, a remarkable achievement.

"It would be relatively easy for the country to become entirely attested, if only people would put their backs into it. One stage would be the prohibition of the importation, principally from Ireland, of any cattle which had not passed the test. He did not think that would involve any hardship, because those Irish cattle were generally clean. 'Quite a lot of our indigenous cattle are also capable of being easily cleaned up,' he said.

"Sir James said he had recently carried out tests on a commercial beef herd of 160 head which he wished to have tested. They had never been previously tested, yet he had found only one doubtful reactor among them. If people were given encouragement to test commercial beef cattle they would find many of these herds were cleaner than they thought them now.

"Mr. George P. Ross said that while the demand for certified milk had certainly been maintained, there had recently been evidence of a tendency on the part of consumers to seek milk in cheaper forms, no doubt brought about by the present economic position. That meant the quality producers would have to continue by every means to supply the best product which modern science, careful herd management, and clean dairy conditions could enable them to produce."

REPORT

[City of Johannesburg: Report of Director of Abattoir and Live Stock Market Department. July 1st, 1948, to June 30th, 1949.]

According to this report, six veterinary surgeons are employed by the department, and there is a large technical and administrative staff, as well as European and native workers. Some 35,882 animals passed through the Live Stock Market during the year, and 828,611 animals were slaughtered at the abattoirs. Meat condemned amounted to 2,379 tons, details of which are shown in an appendix. Cysticercosis and bruising supply the two primary reasons for meat condemnation. The report gives quotations from *The Farmers' Weekly* and *The Meat Trades Journal*, the former dealing with the effects of drought on the maize crop, and the latter quoting the world's meat position as seen by Professor John Hammond, of Cambridge, England, the Professor having been called in to undertake a survey in the Union at the invitation of the Department of Agriculture and the Live Stock and Meat Industry Control Board. He was to advise on improving the Union's cattle and sheep industry as well as the quality and quantity of meat.

Work was commenced on the construction of an additional sheep slaughtering hall. Premiums for pig insurance went up to 2s. 6d. per head for those up to 100 lb. live weight, and 3s. per head for pigs over that weight.

Foot-and-mouth disease occurred in Rhodesia and Bechuanaland, and an embargo was placed upon animal products from these territories entering the Union. Outbreaks of epivaginitis in cattle have been located in the dairy farming areas from which the city draws its milk. The disease has invaded the Union from the Northern Territories. Vaginitis and epididymitis have now been gazetted as scheduled diseases under the Stock Diseases Act. During the year about 1,400 of the city's cattle were inoculated with anthrax spore vaccine.

The city has 1,729 mules and horses, and 1,445 cattle. Veterinary treatment and animal wastage was small. In all, 1,072 dairy herds were visited and 56,312 cows inspected. The usual method of submitting to the biological test bulk milk samples from farms supplying raw milk shops, was supplemented by also testing samples of herd milk supplied to the pasteurising depots. Of the 472 samples tested, four were found contaminated with tubercle bacilli. A pamphlet was prepared for dairy farmers showing measures necessary for the control of *Brucella abortus* infection in cattle. Tests showed that 15 per cent. of herd milk samples contained virulent *B. abortus* organisms. Mastitis is another condition found in 34 per cent. of the milk samples taken from herd milk supplied to the raw milk shops. The Director, Mr. M. C. Robinson, and his staff deserve congratulations upon their useful and interesting report.

D. J. A.

RIVER POLLUTION AND FISH DESTRUCTION

The Duke of Devonshire, presiding at the annual meeting of the Salmon and Trout Association, said that last year was notable for having shown how many more of our rivers were polluted than had generally been supposed. The hot weather caused the wholesale destruction of fish. An attempt had been made to attribute the destruction to the hot water; it was argued that above a certain temperature fish died. His reply to this was that no temperature that ever occurred naturally in rivers in this country would by itself kill fish. The cause of the disasters in which fish were killed wholesale was pollution and nothing else.

VETERINARY SURGEONS ACT, 1948

Supplementary Veterinary Register

The Council of the Royal College of Veterinary Surgeons have directed the Registrar under the above Act to register in the Supplementary Veterinary Register the names of the persons set out below.

This is the fifth list of registrations and the absence of the name of any person who has made application in prescribed form before the prescribed date does not imply that such applicant has been refused registration.

The fifth list consists of further persons in whose cases the Council are satisfied that the requirements of the Act have been met.

The date of registration is Thursday, March 23rd, 1950.

Further lists of registrations in the Supplementary Veterinary Register will be published.

Fifth List of Registrations

Names and Places of Practice

BARRY, Frank, 55, Belgrave Road, Oldham, Lancs.
BEAL, Herbert John, 82, The Bayle, Folkestone, Kent.
BROWN, Leonard Charles Gilbert, 36, Barons Court Road, W.14.
BURTON, John Ralph, 65, Telford Avenue, Streatham Hill, S.W.2.
BUTCHER, Thomas Cecil Redvers, Pool House, Clee Hill, Ludlow.
CAMP, Harold George, 65, Baker Street, Enfield, Middx.
FEATHER, Harry, Overdale, Well Heads, Thornton, Nr. Bradford.
GAUNT, Charles Hodson, 15, Featherstone Road, Kings Heath, Birmingham.
GOOD, Edward Henry, 21, Corve Street, Ludlow, Shropshire.
GUTHRIE, Thomas, Southcroft, Auchterarder, Perthshire.
HYDE, Gerald, 9, Elmfield Avenue, Malton Road, York.
KEECH, Thomas, Wynford, Halstack Leigh, Dorset.
MARGARSON, Edward Thomas, The Bungalow, Mundford, Thetford, Norfolk.
PLANTON, George Frederick, 5, The Quadrant, Redland, Bristol, 6.
PRESTON-HILLARY, Miss Betty Lorraine, 9, Roy Road, Northwood, Middx.
PRITCHARD, Richard Morris, Tyddyn Gwyn, Criccieth, Carnarvonshire.
REYNOLDS, Edward James, Islay House, Great Ellingham, Attleborough Norfolk.
REYNOLDS, Ernest Herbert Buchan, Main Road, Rocklands, Attleborough, Norfolk.
SHERLOCK, Frederick James, Pennisfield Farm, Silver Street, Irlam, Lancs.

The Offices and Library of the Royal College of Veterinary Surgeons

The entrance to the offices of the Royal College of Veterinary Surgeons and the Central Library for Animal Diseases is now on the *ground* floor of *No. 9*, Red Lion Square, and no longer on the first floor.

The hours at which business can be transacted in both the offices and the library are 9.30 a.m. to 5 p.m. on week-days, except Saturday, when the hours are 9.30 a.m. till 12 noon.

Owing to shortages of staff, it is asked that visits and telephone calls will not be made on Saturdays if it can be avoided.

QUESTIONS IN PARLIAMENT

Horses (Export and Slaughter)

Mr. George Jeger (March 23rd) asked the Minister of Agriculture whether he proposes to accept the recommendations of the Departmental Committee on Export and Slaughter of Horses, and in particular whether he will make an order raising the values below which no horse should be allowed to be exported.

Mr. H. A. Price asked the Minister of Agriculture whether he is aware of the illegal traffic in horses which is rampant throughout the country; and what steps he proposes to take in this matter.

Mr. Slater asked the Minister of Agriculture if he is aware of the anxiety that exists about the export of horses to the Continent for slaughter; and if he will bring in legislation to prohibit this.

Mr. T. Williams: The Government are considering the Report of the Committee on the Traffic in Horses for Export and for Slaughter for Home Consumption, and I hope to be able to make a statement at an early date. In the meantime, the present ban on the export of horses for slaughter is being continued.

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Slaughter of Horses (Scotland)

Mr. Spence (March 22nd) asked the Secretary of State for Scotland under what arrangements the slaughter of horses is carried out in Scotland.

Miss Herbison: The slaughter of horses for human food is carried out in Scotland at four slaughterhouses; other horses are slaughtered at some 20 knackeries. In both cases, the businesses are licensed and supervised by the local authorities.

Mr. Spence asked the Secretary of State for Scotland the total number of horses slaughtered in Scotland for the last convenient six-monthly period, showing the total number under two years old and the total number killed under permit for human consumption.

Miss Herbison: The latest information is that contained in the Report of the Rosebery Committee, which shows that some 4,800 horses were slaughtered in Scotland for human consumption in the first six months of 1949. Records of the ages of horses slaughtered are not kept. I have no information about the number of horses slaughtered in Scotland for purposes other than human consumption.

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Hill Sheep Subsidy

Major McCallum (March 21st) asked the Secretary of State for Scotland what decision has been reached on the rate of hill sheep breeding ewe subsidy for the current year; and on what basis it is to be paid.

Mr. T. Fraser: It is proposed to lay before the House tomorrow a Statutory Instrument fixing a rate of 5s. per breeding ewe. In terms of the Hill Sheep (Scotland) No. 2 Scheme, payment will be calculated on the number of eligible sheep in the flock at December 3rd, 1949, or, subject to certain conditions, and if the applicant so elects, on the number of sheep in respect of which subsidy was paid in relation to December 4th, 1946. The 5s. rate will apply to England and Wales as the standard rate, and also to Northern Ireland.

Major McCallum: Does the hon. Gentleman realise that the number of hill sheep in Scotland is still many thousands, even millions, below what it was in 1946, and does he think that this 5s. subsidy will be sufficient to provide the incentive for the building up of sheep stocks?

Mr. Fraser: I have said that in certain circumstances the number of sheep in respect of which the subsidy will be paid may be calculated by reference to the numbers in the flocks in 1946.

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Water Supplies in Rural Areas

Mr. Profumo (March 23rd) asked the Minister of Health what proportion of the £15,000,000 granted under the Rural Water Supplies and Sewerage Act, 1944, has so far been allocated to local authorities towards the capital cost of providing piped water supplies in rural areas; and whether he will make more speedy use of the remainder of this sum for these purposes.

Mr. Bevan: I have allocated grants amounting to £5,709,000 towards the cost of providing piped water supplies in rural areas, and £4,130,000 for sewerage and sewage disposal. Applications for grant in aid of further schemes estimated to cost £16,846,000 have been submitted and will be dealt with as soon as possible.

Mr. Profumo: Is the right hon. Gentleman aware that his answer is a rather poor commentary on the achievements of the Government in this very vital field? Is he further aware that if he could persuade his colleagues not to export so many pipes he might be able to get more speedy financial help to enable this important work to be carried out?

Mr. Bevan: The achievements of the Government in this field in the last 4½ years compare very favourably with those of the previous 30 years.

Squadron-Leader A. E. Cooper: Is the Minister aware that the information he has given to the House is not in accordance with information recently given to the House by the Minister of Agriculture?

Mr. Turton: Can the Minister say what proportion of this grant has actually been paid to the local authorities?

Mr. Bevan: Not without notice.

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Pigs (Marking)

Mr. J. Hay (March 23rd) asked the Minister of Food whether he will amend the regulations relating to the clipping of the ears of pigs at grading sales.

Mr. Webb: Other methods of marking pigs are now being tested. If the hon. Member has any useful suggestion to offer I should be more than happy to consider it.

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Livestock (Damage by Dogs)

Captain Duncan (March 23rd) asked the Minister of Agriculture how many sheep, lambs and poultry in England and Wales have been reported to him as having been killed or damaged by dogs in the years 1947, 1948 and 1949; and if he will give an approximate estimate of their value.

Mr. T. Williams: My Department does not receive regular reports on the subject, and the information which reaches the Department is not sufficiently comprehensive or representative to give an indication of the position throughout the country or to enable me to make any estimate of losses.

Trivia

Quackery

The — Scientific Breeding School advertises: "We guarantee to teach any average breeder or herdsman how to correct the following or his money back: Barren Cows Breed, Keep Cows Breeding, Abortion Plan, Abortion Blood Test, Artificial Insemination, Trichomonosis (*sic*), Semen without service, Remove afterbirth without pulling, Deliver Calves, Diagnose Pregnancy, Sterile Sires, Disease Prevention, Calfhood (Bangs) Vaccination, Udder course and a working knowledge of the generative organs. The breeder's language is used. We use cows dead and alive."—All of this valuable information is imparted in one five-day course!—(*North American Veterinarian*).

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"Bristol Milk"

Mr. Keeling (Twickenham, C.) asked the Minister of Food what was the object of the letter addressed by his department to Messrs. John Harvey and Sons, Bristol, on their description of their sherry; and what action he proposed to take as a result of their refusal to omit the words milk and cream.

Mr. Webb: When a trade mark application was made recently for "Bristol Milk" sherry an over-zealous official wrote a letter to the company raising the question of whether such a trade mark might not be a misleading description of the product. (Laughter.) He should not have done so and the letter was quickly withdrawn. The second part of the question therefore does not arise. But I would like to apologise to the firm concerned for any inconvenience they may have been caused by this mistake. (Cheers.)

Mr. Keeling: Does the right hon. gentleman agree that to connect "Bristol Milk," which has been sold under that name for 300 years, with the product of the cow is quite idiotic and ought he not to employ officials who have a little more knowledge of the things they are handling? (Opposition cheers.)

Mr. Webb: Since I have apologised I do not think I want to add anything to my answer.

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Referring to good husbandry, Mr. Steele-Bodger (in a recent address) said that at one lecture he attended, a farmer had the temerity to ask: "What would you plant in waterlogged ground if you did not plant roots?"

Quick as thought came the answer from the lecturer: "Drain pipes, you —— fool."—*Northampton Chronicle.*

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If all the economists in the world were laid end to end, they wouldn't reach a conclusion.—*Earl Waldegrave.*

NOTES AND NEWS

Diary of Events

Apr. 6th.—Meeting of the Central Veterinary Society, at the Royal Veterinary College, N.W.1, 2 p.m.

Apr. 12th.—Meeting of the N.V.M.A. Editorial Executive Committee, 2.30 p.m.

Apr. 14th.—Dinner Dance to be held by the Yorkshire Division, N.V.M.A., at Leeds (Guildford Hotel), 7.15 for 7.30 p.m.

Apr. 14th.—Meeting of the Biochemical Society, in the Department of Biochemistry and Pharmacology, University College, Dublin, 3.15 p.m.

April 18th.—Annual Meeting of the Southern Counties Division, N.V.M.A., at Bournemouth, 6 p.m.

Apr. 19th.—Meeting of the Association of Veterinary Teachers and Research Workers, at the Royal (Dick) Veterinary College, Edinburgh, 11 a.m.

Apr. 19th, 20th and 21st.—**Quarterly Meetings of Council and Committees, R.C.V.S.**

Apr. 26th.—Meeting of the South-Eastern Division, N.V.M.A., at Ashford (County Hotel), 2.30 p.m.

Apr. 28th.—Meeting of the Yorkshire Division, N.V.M.A., at Leeds (Hotel Metropole), 2.30 p.m.

N.V.M.A. Council and Committees

The next Council and Committee Meetings of the Association will be held at the Royal (Dick) Veterinary College, Edinburgh, on April 26th, 27th and 28th.

The time-table is as follows:—

WEDNESDAY, APRIL 26TH.

11 *a.m.* Veterinary State Medicine Committee.
2.30 *p.m.* Organising Committee.

THURSDAY, APRIL 27TH.

10 *a.m.* Home Appointments Committee.
11.30 *a.m.* Parliamentary and Public Relations Committee.
2 *p.m.* General Purposes and Finance Committee.

FRIDAY, APRIL 28TH.

11 *a.m.* Council Meeting.

R.C.V.S. Examinations

May 4th.—R.C.V.S. Animal Management Examinations commence at Dublin.

May 9th.—R.C.V.S. Entries for D.V.S.M. Examinations due.

May 15th.—R.C.V.S. Pharmacology, etc., Examination (Revised Syllabus): Written Examination.

May 17th.—R.C.V.S. Pharmacology, etc., Examination (Revised Syllabus): Orals and Practicals (London and Dublin).

June 8th.—R.C.V.S. D.V.S.M. Written Examination commences, at Edinburgh.

June 22nd.—R.C.V.S. Membership Written Examination.

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R.C.V.S. ELECTION

Return of Voting Papers

The President of the Royal College of Veterinary Surgeons desires to remind all members who are entitled to vote in the Council Elections of the necessity of returning their voting papers duly completed to the Royal College of Veterinary Surgeons. The final date by which they must be returned is May 22nd, 1950. Unless for any reason a voter desires to delay voting, the sooner a voting paper is returned the less likely it is that it will be lost or mislaid by the voter. Voting papers are sent out to all members early in order that overseas members may have identical ballot papers to those sent to members at home.

This provision enabled a larger overseas vote last year than ever before and has already enabled overseas members to return their ballot papers from such distant countries as Australia.

The President, therefore, would again emphasise—if you desire to use your vote, use it now.

Calf Vaccination Scheme

As already announced, the Ministry of Agriculture's Calf Vaccination Scheme, which has hitherto been restricted to Attested herds, T.T. herds and registered dairy herds, is being extended on April 1st to all other herds including beef herds and rearing herds. At the same time, the charge to the farmer for vaccination under the Scheme is to be increased to 2s. per calf.

Vaccination in Attested herds, T.T. herds and registered dairy herds will normally continue to be done in association with a tuberculin test or herd inspection as the case may be, but, where it would meet the convenience of the farmer and the Local Veterinary Inspector, it may be done at some other time. In other herds, vaccination will be done at a time convenient to the farmer and the Local Veterinary Inspector, normally once a year.

A Local Veterinary Inspector who receives instructions from the Ministry's Divisional Inspector to vaccinate calves under the Scheme may delegate the work to an assistant who is not himself on the panel of Local Veterinary Inspectors, on the understanding that the principal is fully responsible for the work of the assistant. An assistant who is not a Local Veterinary Inspector would not, of course, be eligible to carry out an official tuberculin test or herd inspection in association with vaccination.

In order to join the Scheme, all the farmer has to do is to send a postcard to the Divisional Veterinary Officer, saying that he wishes to join and stating the name and address of his veterinary surgeon.

It is unnecessary for owners of Attested herds, T.T. herds and dairy herds who are already in the Scheme to re-apply.

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PERSONAL

Dr. Stableforth Appointed Director of the Ministry's Veterinary Laboratory

Our readers will learn with much pleasure of the appointment of Arthur Wallace Stableforth, D.SC., M.R.C.V.S., D.V.S.M., to the post of Director of the Ministry's Veterinary Laboratory, New Haw, Weybridge, as from March 3rd last. Dr. Stableforth succeeds Professor T. Dalling, who was promoted to Chief Veterinary Officer to the Ministry from August 21st, 1948, on the retirement of Sir Daniel Cabot.

Dr. Stableforth is a west-country man who after receiving his education at All Hallows school in Devon, graduated from the London College in 1923, having been President of the Student's Union the previous year.

A long period of service in that institution followed, first as demonstrator of pathology under Sir John M'Fadyean, and then (1926-33) as a research worker in the Institute in Animal Pathology under Professor Minett, during which period he was awarded a travelling scholarship in Germany.

In 1933 Dr. Stableforth was appointed senior assistant in charge of the Division of Preventive Medicine in the Royal Veterinary College, and in 1939 came his translation to Weybridge as senior research officer in charge of the bacteriological department of the Ministry of Agriculture's Veterinary Laboratory.

The new Director is well-known to our readers for his researches, particularly in the field of bovine mastitis, upon which he has presented a number of informative and greatly appreciated papers to the meetings of veterinary societies, he being a member of the Agricultural Research Council Mastitis and Abortion Committees, and of various Committees of the N.V.M.A, including those whose enquiries are of a technical nature. Indeed he has long actively been concerned in the promotion of the interests of the scientific societies within the profession or those with which it is associated. He was appointed secretary of the Comparative Section of the Royal Society of Medicine in 1931, and in due course became president of the Veterinary Research Club, taking over the duties of secretary in 1942.

The Central Veterinary Society honoured him with its presidency during the years 1946-7-8, while he is a member of the Pathological Society and of the Nutrition Society, in addition to being an original member of the Microbiological Society.

These activities serve to illustrate what is, perhaps, Dr. Stableforth's foremost enthusiasm—the promotion of active collaboration between research and practice and with the collateral sciences of medicine and agriculture: he is a protagonist of the specialised training of our younger men in order that they may take their

proper place amongst the workers in other fields, such as physiology and biochemistry.

A tribute to Dr. Stableforth's qualities was paid by Authority in 1945, when he was called upon, in company with Dr. E. G. White, to visit Germany to report on the position of veterinary science after the second world war, and on the developments during that period, while his continental experience also includes the delivery of lectures in France on several occasions.

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Appointments.—The following Colonial appointments are announced: Mr. Hugh Kennedy Littlewood, Senior Veterinary Officer, Nigeria, is promoted to the post of Assistant Director of Veterinary Services, Nigeria; Mr. J. G. Prescott is appointed Veterinary Research Officer, Tanganyika, and Mr. H. R. Clifford, Veterinary Officer, Uganda.

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Births.—Crerar.—On March 22nd, 1950, at "The Knowe," Frenze Road, Diss, Norfolk, to Agnes, wife of William Crerar, M.R.C.V.S., a sister for James.

Hargreaves.—On March 10th, 1950, to Gwen and Peter Hargreaves, at Stowe Arthur, Kirkby-in-Furness, a son.

Woodford.—On February 24th, 1950, at Holt Mill, Melbury Osmond, Dorset, to June (*née* Hindmarch), wife of Michael H. Woodford, M.R.C.V.S., a brother for Nicola and Rosemary.

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Death.—Wortley.—On March 25th, 1950, at a Norwich nursing home, Catherine Florence, dearly beloved wife of Walter Hunt Wortley, M.R.C.V.S., Bungay, Suffolk, aged 59 years.

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R.C.V.S. OBITUARY

Crofts, Charles William, 65, St. Giles Street, Northampton. Graduated London, April 11th, 1888, died March 14th, 1950.

Fail, Frederick, O.B.E., M.R.C.V.S., Lieut.-Col. late R.A.V.C. (R.O.). Graduated Edinburgh May 21st, 1898. Died March 18th, 1950; aged 75 years.

Martin, Horace Edward, 27, Bassett Street, Burwood, Christchurch, New Zealand. Graduated N. Edinburgh, May 24th, 1900. Died January 9th, 1950.

Russell, Edmund Cracroft, F.R.C.V.S., Major, late R.A.V.C., 41, Vicarage Court, Vicarage Gate, Kensington, W.8. Graduated Edinburgh, October 20th, 1895; Fellow December 12th, 1903. Died March 25th, 1950; aged 75 years.

John Ripley

An Appreciation*

John Herbert Ripley, who died recently after a few short years of well-earned retirement, was a very fine example of the older school of practitioner. He was of those many men whose names are not prominent in the politics of the profession, but who yet, in their less noticeable way, do perhaps more to enhance the dignity and prestige of the profession than some who are more in the public eye. Certainly this is true of his practice area, and were all practitioners held in such high esteem and affection by their clients as was John Ripley by his, the status of the profession would be self assured.

His life in practice, spent, as it was, mainly in the days when diagnostic ability, practical pharmacy, surgical skill and ideals of service to his clients and patients were the main weapons of the veterinarian, and the easy roads of chemotherapy and laboratory services had not fully opened, puts personal qualities in their proper place.

Throughout his career his ability created trust and respect, and his wholly unselfish ideals of service inspired deep affection in his clients.

No greater tribute can be paid to him as man or as veterinary surgeon than the fact that five years after his retirement from practice, his successors never left a client without an affectionate enquiry after John Ripley.

P. H-P.

*This tribute is repeated from our issue of last week, in proper form, following upon the unintelligible presentation of the second paragraph by our printers, in making a proof correction, for which we must express deep regret.—*Editor.*

Major Edmund Cracroft Russell, F.R.C.V.S.

Major E. Cracroft Russell, whose death we record with much regret, was one of two brothers who served in the R.A.V.C., the other losing his life in the Somaliland Campaign. Their father was an officer of the Indian Cavalry, Captain Russell, who was also a well-known practitioner of Grantham, making a name in equine surgery, with particular reference to the "rig" operation. Major Cracroft Russell succeeded him in practice at Grantham.

The Late Mr. W. A. Curley, M.R.C.V.S.

Concerning the death of Mr. William Annal Curley, whose death was announced in our last issue, "M. H. W." writes:—

"All who knew Bill Curley will be shocked to learn of his sudden death from septicaemia associated with chronic bronchitis.

"He was born at Kingussie, Inverness-shire on July 5th, 1914, the son of Mr. P. Curley, J.P., and the late Mrs. Curley, of Newtonmore. He was educated at Newtonmore and Kingussie Schools and qualified at the Royal (Dick) Veterinary College, Edinburgh, in December, 1939.

"On qualification he managed a practice in Inverness until 1942, when he took a county appointment at Fort William.

"He was married in 1944 to Catherine M. McFarlane, of Spean Bridge, and in 1945 he proceeded to Ilminster, Somerset, where he practised until his death."

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MEDICAL EDUCATION

There has recently been issued the text of the Medical Bill, which provides for improvements in the standard of medical education in accordance with the recommendations of the Goodenough Committee on medical schools, which reported in 1944. The principal proposals relate to the experience required for registration of medical practitioners, the composition of the General Medical Council, and professional discipline.

The Bill provides that before becoming fully registered and entitled to set up in private practice a medical student must first pass his final examination and then spend at least a year in a resident medical capacity in one or more approved hospitals or institutions. A certificate showing that he has given satisfactory service in the hospital or institution will be required. It is also proposed that the General Medical Council shall be empowered to appoint independent visitors to medical schools to report on the sufficiency of the course of instruction.

The proposals for reconstituting the General Medical Council involve an increase in its membership from 39 to 45. It is provided that the King shall nominate five members who are registered medical practitioners and three laymen, two for England and Wales and one for Scotland. The number of persons to be elected to the Council is increased to six for England and Wales and two for Scotland. It is further provided that no person shall be disqualified for membership of the House of Commons by reason of being a member of the Council. But M.P.s on the Council are not to be remunerated for sitting on the Council.

The principal proposal relating to professional discipline concerns the setting up of a medical disciplinary committee, composed of the President and 16 other members of the General Medical Council, of whom at least six shall be elected members of the Council and at least one a layman. Provisions are made for an appeal against disciplinary action to the Judicial Committee of the Privy Council.

The Bill provides for increases in the fees payable for registration in the medical register. The maximum fee which may be fixed in the normal case for full registration, which includes a maximum fee of five guineas for provisional registration after passing a final examination, is eleven guineas unless the Privy Council by order vary the maximum.

[It is of interest to note that, as compared with the provisions of the Veterinary Surgeons Act, 1948, medical graduates are required to remain on in a house appointment for a full year after provisional qualification, whereas in our profession the acquirement of additional clinical knowledge is provided for by increasing clinical instruction throughout the curriculum.

In regard to the setting up of a special disciplinary committee and the appointment of visitors to report upon the teaching and examinations at institutions granting registrable qualifications, the new Medical Bill follows closely our own Act.

Likewise, in the matter of appointment of lay members the Bill follows our Act.

The veterinary profession has a much larger proportion of elected members to its Council as compared with nominated members.]

EASTER MONDAY VAN HORSE PARADE

The London Van Horse Parade Society, 66, Sloane Street, London, S.W.1, holds its thirty-sixth parade of van horses in Regents Park on Easter Monday, April 10th, 1950, with sections for single horsed vehicles, pair horsed vehicles, and led horses. Judging starts at 9.30 a.m., the grand parade of first prize winners takes place at 12 noon.

All exhibits must be shown in the actual vehicle and harness in which they perform their daily work and every driver has an equal chance of securing the Society's first class award. As long as the judges are satisfied that the horse is properly groomed and well looked after, the van is clean, and continuous attention has been given to the harness, the exhibitor will receive a red first class rosette, a brass face-piece and a money prize presented by the Van Horse Parade Society, and a merit badge presented by the R.S.P.C.A. In addition, the Hackney Horse Society will give rosettes to the hackney horses and ponies reaching the standard set by its judges

The parade is run entirely by voluntary subscriptions and new supporters are urgently needed to keep this popular and old-established show going. All those who are interested in London's van horses are asked to give something, however small, to help encourage and reward the owners and drivers of these horses.

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Tuberculosis (Attested Herds) Scheme

STATEMENT SHOWING POSITION IN EACH COUNTY AS AT DECEMBER 31ST, 1949

County	Total Cattle as at 3.6.49	Number of Attested Herds as at 31.12.49	Number of Cattle in Attested Herds as at 31.12.49	Percentage of Attested Cattle to Total Cattle
Bedford	46,479	1 3	5,63	12·1
Berks	84,174	469	25,0 70	29·8
Buckingham	113,472	3 8	16,390	14·4
Cambridge	31,593	96	5,150	16·3
Isle of Ely	21,2 2	28	1,3 0	6·1
Chester	247,492	582	26,720	10·8
Cornwall	275,77	448	15,840	5·7
Isles of Scilly	481	89	48	100·0
Cumberland	224,496	1,484	67,790	30·2
Derby	186,246	298	15,070	8·1
Devon	414,127	751	29,92	7·2
Dorset	149,729	667	35,74	23·9
Durham	117,47	448	16,690	14·3
Essex	123,889	543	25 980	21·0
Gloucester	193,655	555	29,720	15·3
Hampshire	145,9 9	788	35,870	24·6
Isle of Wight	21,182	91	3,720	17·6
Hereford	141.535	32	15,5 0	11·0
Hertford	59,935	272	15 95	26·6
Huntingdon	28,875	36	2,32	8·0
Kent	120,25	437	2 ,760	17·3
Lancaster	278,129	812	31 510	11 3
Leicester	164 788	201	10,530	6·4
Lincoln (Holland)	27,596	3	40	·1
Lincoln (Kesteven)	69,263	42	1,980	2·9
Lincoln (Lindsey)	159,19	84	3,93	2·5
London	—	—	—	—
Middlesex	7,733	29	1,650	21·3
Norfolk	181,444	4 8	27,020	14·9
Northampton	154,23	135	7,840	4·9
Soke of Peterborough	6,917	135	7,840	4·9
Northumberland	2 5,438	32	17,26	8·4
Nottingham	108 927	143	6,2 0	5·7
Oxford	105,698	519	26,560	25·1
Rutland	19.842	14	710	3·6
Salop	282 699	527	31,22	11·0
Somerset	326, 83	1, 11	49,97	15·3
Stafford	238,355	269	12,19	5·1
Suffolk East	81,934	2 5	10,02	12·4
Suffolk, West	38,473	147	8,42	21·9
Surrey	52,004	365	15,49	29·8
Sussex East	108,009	421	16,720	15·5
Sussex West	73,9 7	323	15,530	21·0
Warwick	151,148	265	14, 3	9·3
Westmorland	96,9 4	1,226	49,710	51·3
Wilts	195.868	512	34,280	17·5
Worcester	102 638	179	9, 3	8·8
Yorks, East Riding	135,277	68	2 46	1·8
Yorks, North Riding	25 ,022	715	25,710	10·3
Yorks. West Riding	341.247	1, 82	36,610	10·7
ENGLAND	6,7 9.994	18,838	878,230	13·1
Anglesey	58,5 54	151	4,800	8·3
Brecon	49,223	168	5,900	12·0
Caernarvon	62.281	268	7,72	12 4
Cardigan	76.498	3,749	57, 80	74 6
Carmarthen	137,2 5	4,976	94,71	69·0
Denbigh	104,813	593	16 210	15·5
Flint	62.145	121	5,040	8·1
Glamorgan	76.998	223	6,8 0	7·9
Merioneth	42,677	1,0 7	19,410	45·5
Monmouth	73,08	194	7,890	1 ·8
Montgomery	99,82	485	16.460	16·5
Pembroke	10 3.379	1,854	39,950	38·6
Radnor	39,3 8	49	1,4 0	3·6
WALES	985,381	13,818	282,65	28·7
ENGLAND & WALES	7,695,375	32,656	1,160,880	15·1

County	Total Cattle as at 3.6.49	Number of Attested Herds as at 31.12.49	Number of Cattle in Attested Herds as at 31.12.49	Percentage of Attested Cattle to Total Cattle
Aberdeen	224 228	200	17,260	7·7
Angus	66 445	1 8	11 170	16·8
Argyll	62 415	546	19,830	31·8
Ayr	150 861	2,172	134 050	88·9
Banff	54 644	50	3,590	6·6
Berwick	34,582	52	3,490	10·1
Bute	10,5 9	326	9,710	92·4
Caithness	26,749	147	3,790	14·2
Clackmannan	4,647	3	1,950	41·9
Dumfries	102,204	1,388	75,310	73·7
Dunbarton	16,6 8	234	11,660	70·2
East Lothian	16, 65	46	3,600	22·4
Fife	62 843	3 4	21,040	33·5
Inverness	52 346	69	3,870	7·4
Kincardine	37,742	53	4,450	11·8
Kinross	8,891	47	3,320	37·4
Kirkcudbright	73,438	798	52,870	72·0
Lanark	92,892	1,26	68,410	73·6
Midlothian	24,637	194	10,100	41·0
Moray	29,3 6	49	3,860	13·2
Nairn	8,035	19	1,370	17·1
Orkney	48,598	101	3,230	6·6
Peebles	11,475	166	6,720	58·5
Perth	91,755	232	15,110	16·5
Renfrew	3 ,721	398	20,690	67·4
Ross-shire	39,618	41	2,180	5·5
Roxburgh	34,948	61	3,900	11·2
Selkirk	6,117	44	1,480	24·1
Stirling	40,645	380	19,590	48·2
Sutherland	9,878	82	700	7·1
West Lothian	15,281	123	6,450	42·2
Wigtown	71,953	6 6	50,100	69 6
Zetland	7,494	1,9 7	6,47 •	100·0
SCOTLAND	1,568,57	12,233	6 1,320	38·3
GREAT BRITAIN	9,265,945	44,889	1,762,2 0	19·0

• All cattle herds in Zetland and Isles of Scilly are attested. This figure represents the number of animals in the last test of the herds.

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SHEEP SCAB IN CUMBERLAND

PATROL SHEPHERDS APPOINTED

Serious outbreaks of sheep scab, which have recently occurred in Cumberland, were referred to at a meeting of Cumberland County Council at Carlisle on March 8th, and the Chairman (Mr. Charles Roberts) moved, as a matter of urgency, that the County Council approve the appointment of two patrol shepherds to assist in dealing with these outbreaks.

Mr. G. N. C. Swift, Clerk to the County Council, reported that a letter had been received from the Ministry of Agriculture and Fisheries stating that the Ministry was gravely concerned about the occurrence, since the beginning of last October, of no fewer than 16 outbreaks of sheep scab among the flocks in Cumberland. The Ministry felt that the situation called for drastic action and they proposed to make an Order applying to the whole of Cumberland, prohibiting, except under licence, the movement of sheep from Cumberland.

Mr. Roberts said the putting into force of the Order would cause inconvenience and expense to flockmasters in the county, but it would, he hoped, give to southern purchasers of sheep an assurance that no sheep would be exported from the county unless they had undergone the necessary dipping to ensure that they were free from the parasites concerned. The Ministry of Agriculture was increasing its veterinary staff by two inspectors, who would be allocated to that work, and that ought to be a great help in stamping out the disease. In addition, the Ministry asked the Council to appoint two patrol shepherds, who would investigate any case arising and help flockmasters to get rid of any stray sheep that might be infected.

That would cost the county a sum which was not likely to exceed £1.000. It was of the utmost importance that the county should take the most drastic steps to get rid of this disease. One of the patrol shepherds would be for work in the North Eastern part of the county, and the other, perhaps, in West Cumberland.

Sir Fergus Graham, in seconding the motion, said he did so with regret that this necessity had arisen. They thought they had reached the time when the county was clear of any suggestion of sheep scab and it was now absolutely necessary that they should clear the matter up.

Mr. J. F. Herdman, Alston, pointed out that the regulation would cause very great hardship on many of the hill farmers in Cumberland and he appealed to the council to make the obtaining of licences as reasonable as possible.

The Chairman explained that licences would be given for sheep that were intended for immediate slaughter and had been dipped in accordance with the regulations. The resolution was passed and referred to the Small Holdings Committee, which was deputed to make the appointments and take the appropriate action.

LEGAL NOTES

Cattle Poisoned by Red Lead Paint: Damages Awarded.—Lord Sorn, in the Court of Session on March 21st, gave judgment making an award of £200 to Thomas Linden, farmer, Shalloch, Bishopton, Renfrewshire, jointly and severally against the Lord Advocate as representing the Ministry of Supply, and Robert A. Thom & Co., Ltd., 54, Gordon Street, Glasgow, in respect of damage caused by the poisoning of cattle by ingestion of red lead paint. His Lordship made an award of £588 17s. jointly and severally against the same defenders in favour of John Ritchie, farmer, Barrangary, Bishopton, and also a further award of £25 against Messrs. Thom.

Mr. Linden and Mr. Ritchie were both lessees of ground appertaining to the Royal Ordnance Factory at Bishopton. The factory is surrounded by an iron fence. In 1947 the Ministry of Supply, who leased the ground, placed a contract with Messrs. Thom & Co. for the painting of the fence. The contract specified that the fence was to be given three coats of paint, first a coat of red lead, then a coat of grey, and finally a surface coat of green. The fence was over ten miles in length, and it was not until June, 1948, that the work approached the ground in question.

It was averred that the painters left a considerable number of splashes of red lead paint on the grass. Mr. Linden claimed in respect of the death of a heifer through lead poisoning, and Mr. Ritchie claimed in respect of the death of six cattle from the same cause and in respect of injuries to others and loss of grazing.

Lord Sorn said it was plain that some spillage of paint on the grass and the possibility of paint-laden implements being left about was to be anticipated as normally incidental to the work. His conclusion was that the operation was one which, even if properly done, manifestly involved risk, and the Ministry of Supply did not escape the consequences of their failure by showing that the degree of risk was unnecessarily increased by the painters. In any event, the Ministry, through their representatives, had day by day watched this squad at work, and it was difficult for his Lordship to believe that they were not fully aware of the slipshod way in which the work was actually being done.

Regarding the case against Messrs. Thom & Co., his Lordship said that on a fair reading of the evidence he was left without the slightest doubt that both the foreman and those who supervised the work were fully aware that red lead was poisonous to animals, and that the omission to take precautions was the result of sheer thoughtlessness.

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FLUORIDE IN DRINKING WATER

The Ministry of Education announce that over 3,000 school-children in various parts of England will shortly take part in a test of the effectiveness of a new treatment designed to protect children's teeth against decay.

It has been well known for some years that when the drinking water of an area contains a small quantity of fluoride, the amount of dental decay in such an area is very much less than in places where there is no fluoride in the water supply. Unfortunately, there are only a few areas in this country where the water does contain fluoride, but there are good grounds for believing that a comparable effect is produced by wetting the teeth on several occasions with a solution containing fluoride. The treatment is quite harmless; it causes no pain or discomfort of any kind, nor does it affect the appearance of the teeth. The solution used looks, in fact, exactly like water. It is this treatment which will be fully tested under the Ministry's scheme over a period of some years, the children's teeth being examined annually.

Because of the shortage of dentists it is not possible to offer this treatment at present to all children in this country, but arrangements have been made for it to be available for a limited number of children in different parts of the country. It will be given by the staffs of a number of dental hospitals and of local education authorities. The participating bodies are: Eastman Dental Clinic, London (in co-operation with the London County Council), Newcastle Dental Hospital, Newcastle Local Education Authority, Leeds Local Education Authority, West Riding Local Education Authority, Sheffield Dental Hospital, Sheffield Local Education Authority, Birmingham Dental Hospital, Bristol Local Education Authority, and, possibly, Middlesex Local Education Authority. The methods of selecting the children may vary according to local arrangements, but no child will receive the treatment without the parent's consent. Both boys and girls will be included, but it is not proposed at present to give the treatment to any child over 12 years, the reason being that such children would have left school before the full effects of the treatment could be observed.

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Foot-and-Mouth Disease:

Berkshire.—Rooks Nest, Lambourne Woodlands, Berks (March 26th).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

EXPERIMENTAL REPRODUCTION OF OEDEMA DISEASE OF SWINE

Sir,—Since my last letter to *The Veterinary Record* published in your issue of October 22nd, 1949, giving the salient results of the researches conducted at this laboratory on oedema disease of swine, among which was recorded for the first time the successful experimental reproduction of the disease in 12 pigs, it is now desired to place on record for the benefit of those workers engaged in the investigation of this disease that, to date, it has been reproduced in a total of 32 pigs. The intravenous method of inoculation has been adhered to, and the material inoculated consisted of the supernatant fluid from centrifuged samples of small intestinal contents from typical cases of oedema disease, or the supernatant fluid of centrifuged small intestinal contents previously extracted with normal saline. It can now be accepted that this method of reproduction of oedema disease of swine rests on a solid foundation.

Yours faithfully,

J. F. Timoney,
Director.

Veterinary Research Laboratory,
"Thorndale,"
Beaumont Road, Dublin.
March 23rd, 1950.

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RESEARCH INTO THE DISEASES OF DOGS

Sir,—In your issue of March 18th, p. 158, there is an abridged report of a speech by Mr. S. F. J. Hodgman, M.R.C.V.S., to a public meeting in support of the Animal Health Trust. Concerning the Animal Health Trust Mr. Hodgman is reported to have said: "Nowhere else was research into the diseases of dogs being carried out for the sake of the dogs themselves, in contradistinction to their role as 'guinea pigs' in research."

This statement is inaccurate and injurious to veterinary surgeons other than those employed by the Animal Health Trust.

Yours faithfully,

529a, Finchley Road, London, N.W.3. Tom Hare.

March 21st, 1950.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange*	Sheep Scab	Swine Fever
Mar. 1st to 15th, 1950	26	3	8	—	3	—
Corresponding period in—						
1949	6	1	14	—	8	—
1948	4	—	34	—	2	2
1947	5	14	1	—	—	—
Jan. 1st to Mar. 15th, 1950	104	9	36	—	18	—
Corresponding period in—						
1949	34	6	101	—	21	4
1948	25	—	129	1	18	7
1947	15	77	2	1	13	10

Note.—The figures for the current year are approximate only

* Excluding outbreaks in Army Horses.